THE STANLEY WORKS

Since 1843

NEW BRITAIN, CONNECTICUT 06050

(203) 225-5111

February 29, 1984

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

Dear Ms. Bush:

Enclosed please find the additional information you have requested to complete the review of the Delisting Petition (#0533) submitted by The Stanley Works Corporate Laboratory for the Stanley Tools - Fowlerville facility. I have attached the Material Safety Data Sheets for the chemical compounds used in our finishing process that may enter the waste stream. You will note that I have not included the data sheets on the basic raw materials that make up the primary plating process solutions such as, sodium cyanide, caustic soda, copper metal anodes, nickel sulfate hexahydrate, nickel chloride hexahydrate, boric acid, nickel metal anodes, chromic acid, sulfuric acid, and insoluble lead metal anodes. Much information on the safety and toxicity of these materials can be readily obtained from a variety of reference materials.

The additional information you have asked for, will be answered in Paragraph form.

1. Past Disposal Practices:

The Stanley Works acquired the Stanley Tools - Fowlerville facility in January of 1980. The metal hydroxide sludge was accumulated in the surface impoundments until October 1980, when approximately 97,000 gallons of metal hydroxide sludge was pumped out of the surface impoundments by Chem-Met Services of Wyandotte, Michigan and transported to their facility for disposal. The remaining sludge was left to accumulate in the surface impoundments and became regulated as hazardous waste Code #F006 under RCRA on November 19, 1980.

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Re: Delisting Petition #0533

2. Current Disposal Practices:

Chem-Met Services, EPA ID# MID096963194, is still being contracted as the disposal firm for the F006 waste stored in the surface impoundments. Once yearly, the surface impoundments are pumped out. The F006 sludge is transported to Chem-Met's facility where the sludge slurry is dewatered and the resultant solid sludge is combined with other solid metal hydroxide sludge of the same hazardous waste code classification. The solid material is then transported to Wayne County #2 Landfill for disposal.

3. Proposed Disposal Practice:

In the event that the F006 waste is delisted, the sludge would be handled as a solid waste and would be sent to Chem-Met Services for dewatering. The solid sludge that remains after dewatering would be sent to an engineered landfill for proper disposal.

4. Tests for Characteristic Hazardous Waste:

Ignitability Characteristic; The F006 sludge would not exhibit the characteristic of ignitability because the material is an aqueous slurry with approximately 97% water and 3% solid metal hydroxide sludge which does not readily ignite nor support combustion. This material does not exhibit a Flash Point less than 140°F.

Corrosivity Characteristic; The F006 sludge does not exhibit the characteristic of corrosivity. When the pH of the sludge was measured, it was found to fall within the 9.03 to the 10.50 pH range which is within the non-corrosive pH range.

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Reactivity Characteristic; The F006 sludge does not exhibit the characteristic of reactivity. The sludge does not react violently with water and when exposed to mild acids or alkalies does not generate toxic gases or vapors. Analysis of the sludge indicates that the free cyanide level in the sludge is well below 10 mg/l limit.

5. Total Metal Analysis, Arsenic, Mercury & Selenium:

The total metals analysis for arsenic, mercury, and selenium has been provided in Part I of the Delisting Petition. This information is available on Pages 7 and 55 of Part I of the Petition.

6. Total Organic Carbon Analysis:

Attached, with this letter, are the results of the Total Organic Carbon analysis (TOC) performed upon sludge samples from both the clarifier blowdown and the surface impoundment system. As discussed with Mr. Morse in our phone conversation of January 27, 1984, five representative samples would have to be submitted for TOC analysis. One sample being a composite sample of the clarifier blowdown, and the remaining four being composite samples taken from each of the four surface impoundments. Due to extremely cold weather conditions, two of the surface impoundments have frozen over making composite sampling of those two surface impoundments virtually impossible. I advised Mr. Morse of this situation and he had suggested that we forego the composite sampling of those two impoundments and obtain grab samples from them.

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

The sampling was performed on February 7, 1984. Composite samples were obtained from surface impoundments Numbers 3 and 4 and grab samples were taken from surface impoundments Numbers 1 and 2. A composite of the clarifier blowdown was obtained from grab samples taken during the blowdown periods.

You will also note that along with the TOC analysis, the samples were also tested to determine the presence of the metal Thallium. Though Thallium is not listed as an EP Toxic Metal, a review of the Material Safety Data Sheets has alerted us to the fact that one of the products in use, Isobrite 607 used in our cyanide copper plating solution as an additive, contains small amounts of Thallium Carbonate. Each sample was analyzed for Total Thallium based upon the dosage rate of Isobrite 607, (one-third gallon per day added to a 5000 gallon plating tank with a small dragout rate), we would estimate that the amount of Thallium that may enter the sludge would be extremely small.

I am also including a summary sheet with this letter, detailing the analyses performed and the results of those analyses.

I will once again remind both you and Mr. Morse that the Stanley Tools-Fowlerville facility has received a request from EPA Region V for the submission of their Part B Permit application. The submission date is targeted for July 15, 1984.

I hope this additional information will assist you in completing your review of the petition in a timely manner. Should any additional information regarding this petition be needed, please contact me as soon as possible.

Sincerely,

William J. Guerrera

William J. Guerrera
Environmental Chemist
Stanley Laboratory
1309 Corbin Avenue
New Britain, CT 06053
(203) 225-5111 - Ext.5211

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Ms. Barbara Bush
RE: Delisting Petition #0533

Analysis Data:

Sample #	Type	TOC	mg/l	Thallium (Tl)
1000	Blowdown Composite	1,400		2.0*
1001	Lagoon #1, Grab	51		2.0*
1002	Lagoon #2, Grab	3,100		2.0*
1003	Lagoon #3, Composite	1,300		2.0*
1004	Lagoon #4, Composite	100		2.0*

* - Not detected, concentration found to be lower than the detection limit given.

The analytical data presented on this page has been developed by Baron Consulting Company. The Thallium analysis was performed on a Perkin-Elmer 503 Atomic Absorption Spectrophotometer. The Thallium values were quantified by the method of standard additions. The TOC analysis was performed in accordance with Method 415.1 described in EPA-600/4-79-020 STORET No. 00680.

STANLEY

THE STANLEY WORKS

Since 1843

P.O. Box 1800
NEW BRITAIN, CONNECTICUT 06050

(203) 225-5111

October 21, 1983

Mr. William D. Ruckelshaus
Administrator
U.S.Environmental Protection Agency
Washington, D. C. 20460

RE: STANLEY TOOLS - FOWLERVILLE
EPA ID #MID099124299

Dear Mr. Ruckelshaus:

The following petition for the delisting of electroplating wastewater treatment sludge, EPA Hazardous Waste Code Number F006, is being submitted to you by The Stanley Works Corporate Laboratory. The Stanley Works is the owner of the Stanley Tools facility located in Fowlerville, Michigan and herein identified as Stanley Tools - Fowlerville.

The facility's electroplating operations are cyanide copper, watts nickel, and hexavalent chromium. The rinse waters from these operations are treated in tanks. Vibratory finishing waste from the deburring of zinc base die-casts is discharged to the surface impoundment system for settling.

The F006 waste is being generated in a clarifier at the Fowlerville facility. The underflow from the clarifier is directed to surface impoundments for both sludge storage and increased solid-liquid separation. The supernatant liquid from the surface impoundments is directed to a receiving stream and discharged under the guidelines of an NPDES Permit.

This petition will be submitted in two parts. The first part will provide the requirements pursuant to Title 40CFR Part 260.22 with the exception of the cyanide analysis, and the determination of the oil and grease content of the sludge.

Mr. William D. Ruckelshaus
U. S. Environmental Protection Agency

RE: STANLEY TOOLS - FOWLERVILLE
EPA ID #MID099124299

The presence of a sulfide compound contaminant in the sludge samples has interfered with the cyanide determination which resulted in non-repeatable results. When a suitable method to determine cyanide in the presence of sulfide was obtained, the sludge samples had aged thus altering the concentration of the cyanide in the sludge.

As discussed in a phone conversation with Mr. Myles Morse on August 31, 1983, fresh samples of the underflow from the clarifier before discharge to the surface impoundments will be taken. These samples would be representative of our sludge generation, at a worst case condition since the sludge would not be allowed to further settle and age in the surface impoundments. The samples will be analyzed for Total, Amenable, and Leachable Cyanide, as well as oil and grease content. The results of these analyses will be submitted in the second part of the delisting petition.

The sludge exhibited some unusual characteristics when subjected to the EP Toxicity Extraction Procedure. In all cases, the maximum amount of acetic acid for the weight taken had to be added to the sample and still the resultant pH never dropped near the pH 5.0 range. A composite sample of all the samples taken was made up and tested. The extract metal analyses from the composite sample are lower than the statistical average that would be expected from the individual sample extract analysis.It appears that compositing causes a reaction to occur which binds the metals therefore making them less mobile.

The delisting petition certification will be signed by a Corporate Vice President. I greatfully request that any inquiries regarding this petition be referred to me.

Sincerely,

THE STANLEY WORKS

William J. Guerrera

William J. Guerrera
Environmental Chemist
Stanley Laboratory
1309 Corbin Avenue
New Britain, CT 06053
(203) 225-5111 - Extension 5211

jzz

EPA ID #MID099124299

PETITIONER:

OWNER: THE STANLEY WORKS
195 LAKE STREET
NEW BRITAIN, CONNECTICUT 06050

OPERATOR: STANLEY TOOLS - FOWLERVILLE
425 FRANK STREET
FOWLERVILLE, MICHIGAN 48836

STATEMENT OF INTEREST AND NEED:

The Stanley Tools facility, in Fowlerville, Michigan, a Division of The Stanley Works, is primarily involved in the manufacture, plating and finishing of zinc base die-castings. The facility treats cyanide, hexavalent chromium and nickel electroplating rinse waters. The underflow from the clarifier is directed to the first of four settling lagoons which are in series. The bulk of the settling occurs in Lagoon #1 while further settling is achieved in the remaining lagoons. The final discharge from Lagoon #4 is directed to a receiving stream under the guidelines of an NPDES Permit. The State of Michigan is one of several areas throughout the United States with the lack of sufficient hazardous waste disposal capacity.

Of particular interest to The Stanley Works is that the electroplating wastewater treatment sludge generated at the clarifier and stored in the surface impoundments be removed from the hazardous waste listing for the following purposes:

1. The result of the EP Toxicity Test indicate that the hazardous waste constituents in the sludge are below the hazardous criteria for a toxic waste.

2. The present method of sludge handling, and transporting for final disposal, is extremely expensive and has overburdened the facility's operating budget.

3. The dewatered sludge is capable of being accepted by an approved solid waste landfill.

EPA ID #MID099124299

PROPOSED ACTION:

That the EPA exclude the Stanley Tools - Fowlerville Division's electroplating wastewater treatment sludge from Sub Part D, 40CFR Part 261.31 which presently lists EPA Hazardous Waste Code Number F006, Wastewater Treatment Sludges from Electroplating Operations.

The following information is supplied pursuant to 40CFR Part 260.22:

1. Name and Address of the Laboratories performing the testing.

   a) The Stanley Works
   Corporate Laboratory
   1309 Corbin Avenue
   New Britain, CT 06053

   b) TRC Environmental Consultants
   800 Connecticut Blvd.
   East Hartford, CT 06108

2. Name of person sampling and testing the waste.

   a) Sampling - Reza Rejaei, Stanley Tools - Fowlerville

   The lagoon sampling and sample compositing was performed by Mr. Rejaei on March 17, 1983. Mr. Rejaei is employed as a chemist by the Stanley Tools facility in Fowlerville, Michigan and holds a Masters degree in Engineering Management. The sampling was conducted in accordance with the lagoon sampling methodology as discussed in a letter to Mr. Morse on March 15, 1983. A copy of the letter is enclosed for reference. A dipper sampler was used to collect the samples from the quadrants A minimum of four grab samples were taken from each quadrant. Approximately three-quarters of a gallon was collected with each sampling pass. The dipper was pulled through the sludge from top to bottom to obtain a representative cross section sample. The samples were collected in a bucket and composited and one gallon was poured off and placed in a nalgene bottle and labeled with proper identification, the sampler was then cleaned and the procedure was repeated on another quadrant. The samples were sent to the Corporate Laboratory for analysis.

EPA ID #MID099124299

b) Testing - William J. Guerrera, The Stanley Works Laboratory

Mr. Guerrera was responsible for the sample handling, percent solids determination, and performing the EP Toxicity Extractions on the samples. He is an Environmental Chemist in the Environmental Science Section of The Stanley Works Corporate Laboratory and holds a Bachelors Degree in Chemistry and an Associates Degree in Chemical Engineering with over six years environmental control experience.

Philip L. Talarico, The Stanley Works Laboratory

Mr. Talarico was responsible for the metals analysis by Atomic Absorption Spectroscopy, and the wet chemical analysis for the cyanide determinations. He is an Analytical Chemist for The Stanley Works Corporate Laboratory, and holds a Masters Degree in Science with over twenty-eight years analytical chemistry experience.

c) Outside Testing - Margaret Flanagan, Ann Levine, TRC Environmental Consultants.

TRC Environmental Consultants were contacted to perform metals analysis on metals not routinely analyzed by The Stanley Works Laboratory. A composite sample made up of all the samples taken from the lagoons was sent to TRC for the determination of total arsenic, mercury, and selenium in the sludge. Since these materials are not used in our process, analysis for total metals will be performed. If the analysis indicates that the concentration of the constituents is sufficient enough to yield a leachable metal concentration greater than the allowable EP Toxicity limits, an EP Toxicity Extraction will be performed upon the sludge and the concentration of the suspect metals in the extract will be determined.

The attached resumes are those of the analysts employed by TRC who performed the analysis on the sludge. TRC Laboratory is certified by the Connecticut State Department of Health as an Approved Public Health Laboratory (PH-0426).

MARGARET FLANAGAN

EDUCATION

1972, B.A. Saint Joseph College, West Hartford, Connecticut, Chemistry

Graduate courses at Central Connecticut State College and University of Hartford

Completed the State of Connecticut Director of Laboratory Qualifying Exam

SUMMARY OF EXPERIENCE

Ms. Flanagan is an Senior Chemist - Inorganic Section in TRC's Chemistry Laboratory. She participates in the analysis of environmental samples using instrumental and wet chemical methods. She is specifically working on the development of new analytical procedures using the Perkin-Elmer 560 Atomic Absorption unit which is equipped with auto samplers, data printer, metal hydride generator and HGA furnace. She has performed a variety of chemical analyses on a range of projects. These include the analysis of leachate from flyash for a utility (arsenic, selenium, chromium, nickel, calcium, zinc, antimony, molybdenum, boron, aluminum, and manganese) and effluent from a sewage treatment facility (solids, BOD, COD - by the micro-ampulmatic procedure, nitrogen, nitrate, oil and grease, cyanide, and a variety of heavy metals). She has conducted the analysis of hi-vol filters for vanadium, lead, bromide, iron, TSP, and sulfate using the methyl-thymol blue auto-analyzer method. Sludge samples have been analyzed for heat content, sulfur and metals such as mercury and chromium. She performs the EPA emission analytical methods for particulate, SO_2 and NO_x.

Ms. Flanagan has participated in projects requiring on-site chemical analysis. These include a tracer study involving the dispersion of sulfur dioxide using gas chromatography and colorimetric procedures. She has assisted in the determination of the efficiency of organic vapor emission control in the chemical industry. Another program was conducted for the EPA to determine the emissions from fertilizer plants. For this project, she conducted and compared methods of analysis involving standard colorimetric procedures and instrumental methods. She also modified procedures for the particular interferences encountered.

Prior to working at TRC, Ms. Flanagan was a manager of an electroplating analytical laboratory which performed wastewater analysis and developed new analytical procedures for the plating solutions using atomic absorption methods. She also participated in the development of analytical procedures to determine the quality of photocopier products.

PROFESSIONAL AFFILIATIONS

American Chemical Society

ANNE M. LEVINE

EDUCATION

1981	Kevex Training Course - X-ray Energy Spectrophotometry
1978	Perkin Elmer Training Course - Atomic Absorption Spectrophotometry
1977, B.S.	Trinity College, Hartford, Connecticut, Chemistry

SUMMARY OF EXPERIENCE

Ms. Levine is a Chemist in TRC's Chemistry Laboratory. Her responsibilities include the chemical analysis of water, coal, and ash samples. She works with a variety of instrumentation including the atomic absorption spectrophotometer, UV/visible spectrophotometer, infrared analyzer, and others. She is familiar with most standard procedures recommended by EPA, and ASTM for pollutant analysis.

Ms. Levine has also participated as a TRC project team member on various programs. In this role, she provides project managers with chemistry-related knowledge and skills. In a recent project, she performed metal analyses on the atomic absorption spectrophotometer for coal, fly ash and bottom ash samples. She has also participated in a water quality monitoring program for a utility plant project in which she analyzed pollutant metals in coal pile runoff samples. She determined the matrix interferences and utilized methods of chemically treating these samples to eliminate such interferences. In a hazardous waste management program, she researched literature on attenuation of metals in ground water as related to hazardous waste dumping, and provided the chemistry of these metals as explanation of reactions in the soil.

Prior to joining TRC, Ms. Levine was a quality control chemist for Pratt & Whitney Aircraft. Her main responsibilities were the programming, maintenance, and procedural analysis of a computerized Kevex X-ray Energy Spectrophotometer. Prior to that assignment, she placed the computerized Jarrell-Ash Direct Reading Spectrophotometer on line as a simultaneous multi-element analyzing tool for complex metal alloys. She de-bugged many wet chemical procedures, as well as wrote manual sections for their final established procedures. Through this experience Ms. Levine has gained extensive knowledge regarding quality control and quality assurance of laboratory analysis work.

While attending Trinity College, Ms. Levine completed an independent study research project entitled "The Applicability of Polarography and Atomic Absorption Spectrophotometry in Elemental Analysis of Europium and Ytterbium in Binary Hydride Compounds".

PROFESSIONAL AFFILIATIONS

American Chemical Society

3. Testing Dates:

a) EP Toxicity Extraction for Metals and Percent Solids Data:

3/22/83	4/13/83
3/23/83	4/19/83
3/29/83	4/21/83
4/12/83	

b) Total Metals Analysis and Leachate Analysis by Atomic Absorption Spectroscopy:

3/29/83	4/25/83	5/18/83	7/8/83	8/4/83
4/6/83	4/26/83	6/6/83	7/11/83	8/5/83
4/11/83	4/29/83	6/20/83	7/12/83	8/9/83
4/17/83	5/2/83	6/22/83	7/13/83	
4/18/83	5/5/83	7/5/83	7/14/83	
4/19/83	5/10/83	7/7/83	8/3/83	

4. Location of the Generating Facility:

425 Frank Street
Fowlerville, Michigan 48836

5. Description of Manufacturing Processes, Raw Materials Used and Assessment of Operations:

The Stanley Tools - Fowlerville facility is primarily involved in the manufacture, finishing, and plating of zinc base die-castings. The facility operates under the primary Standard Industrial Classification Code Number 3428. Other operations include processes identified under S.I.C. Code Number 3400. The electroplating process discharges are regulated by the NPDES Program.

The raw materials producing the wastewater for treatment are rinse waters following the process solutions, and zinc vibratory finishing waste discharges. The primary process solutions are copper, nickel and chromium. Presently, the chromium plating solution that enters the rinse water as drag-out from the chromium plating process is recovered. Process solutions which are not reclaimed are treated in tanks at the facility. The sludge generated is stored in surface impoundments to achieve settling and further separation of solid and liquid. The top water from the surface impoundments is directed to a receiving stream under the guidelines of an NPDES Permit.

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PROCESS DESCRIPTION:

a) Deburring of zinc die-castings:

Zinc die-cast parts are trimmed and then placed in vibratory finishing equipment. Preform cone-shaped media and liquid burnishing compounds are added to achieve deburring. The parts are agitated for 1/2 hour. The parts are then rinsed and dried with the washings directed to a containment sump.

b) Buffing:

Following the deburring process, the parts proceed to a buffing operation where the parts are buffed to yield a highly reflective surface.

c) Plating Operations:

The buffed die-cast parts are then racked and transferred by a conveyor line to the plating area. The plating process involves the following procedures with subsequent rinses:

1) Alkaline Clean -

A mild alkaline soap cleaner SU-486 manufactured by MacDermid, Inc.

2) Alkaline Clean -

A mild alkaline cleaner P-1777 manufactured by MacDermid, Inc.

3) Electro Clean -

A mild alkaline electrocleaner EN-1751 manufactured by MacDermid, Inc.

4) Acid Dip -

5% Sulfuric Acid.

5) Copper Strike -

Contains sodium cyanide, caustic soda, and copper metal.

6) Copper Plate -

Contains sodium cyanide, caustic soda, and copper metal.

7) Electro Clean -

A mild alkaline electrocleaner B-920 manufactured by Benchmark Company.

8) Acid Dip -

2% Sulfuric Acid.

9) Nickel Plate -

Contains nickel sulfate, nickel chloride, boric acid, and sulfuric acid.

10) Chrome Activator -

A 2% Chromic Acid Solution.

11) Chromium Plate -

Contains chromic acid and sulfuric acid.

d) Rack Stripping Operation:

The racks used to hold the parts during the plating operation have to be stripped before they can be reused. The stripping operation produces a better contact between the parts and the rack thus increasing the conductivity when the parts are immersed in the plating solution. The stripping process is as follows:

1) Nitric Acid Stripper -

60% Nitric Acid, and 6% Acid Activator Clepo 569N manufactured by Frederick Gumm Chemical Company.

2) Neutralization Rinse -

A soda ash solution used to neutralize acid drag-in.

6. General Description of Wastewater Treatment Operations:

The rinses following plating processes and any spills of process solutions are collected in separate tanks in the plating area. From these tanks, they are pumped to various treatment areas at the facility, for treatment. Details of the treatment methodology are as follows:

1) Nitric acid solution from the rack stripping operation is combined with the first alkaline cleaner in the plating process line. The combined solution is then shipped off-site for treatment and disposal.

2) The alkaline cleaner, electrocleaner, and acid dip solution prior to the copper plating process are pumped to the clarifier. Lime and caustic soda are added for pH adjustment and a polyelectrolyte is added to aid precipitation.

3) Cyanide rinses and the electrocleaner after the copper plating process, are pumped to the cyanide retention tank for cyanide treatment. Caustic soda is added for pH adjustment; sodium hyprochlorite is added to oxidize the cyanide; sodium bisulfite is added for the treatment of residual chlorine; sodium hydrosulfite is added for the reduction of chromium which is slowly leached out of the racks by the copper plating solution; calcium chloride, ferrous sulfate and aluminum sulfate are added for the treatment of copper; and finally, a polyelectrolyte is added to aid precipitation. The treated wastewater is then pumped to the clarifier for pH adjustment and further precipitation.

4) The acid dip, prior to the nickel plating bath, is pumped to the clarifier unit for pH adjustment use.

5) Nickel plating rinse waters are pumped to the clarifier for pH adjustment and precipitation.

6) Chromic acid solutions and rinse waters are pumped to the chrome recovery system. The chrome recovery system is now a closed loop system. We recover and regenerate hexavalent chromium through the use of a ChromeNapper manufactured by Innova, Inc. The use of this recovery equipment has significantly reduced our need to treat chromium in our discharge.

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7) The zinc vibratory finishing waste is pumped from the containment sump to Lagoon #1 for settling.

8) All metal free-rinses are pumped to the neutralization basin for pH adjustment.

9) The treated wastewater overflow from the clarifier discharges to the neutralization basin for pH adjustment, then is gravity fed to Lagoon #3. The underflow from the clarifier (metal hydroxide sludge) discharges to a holding tank, then is pumped to Lagoon #1 for settling. There are four lagoons connected in series. The clarifier underflow flows gradually from Lagoon #1 through Lagoons #2 and #3 into #4 and is finally discharged to the receiving stream.

10) The metal hydroxide sludge (F006) remains in the lagoons and is allowed to accumulate for a period of one year. At the end of a year's time, the sludge is pumped from the lagoons into tanker trucks and sent for disposal.

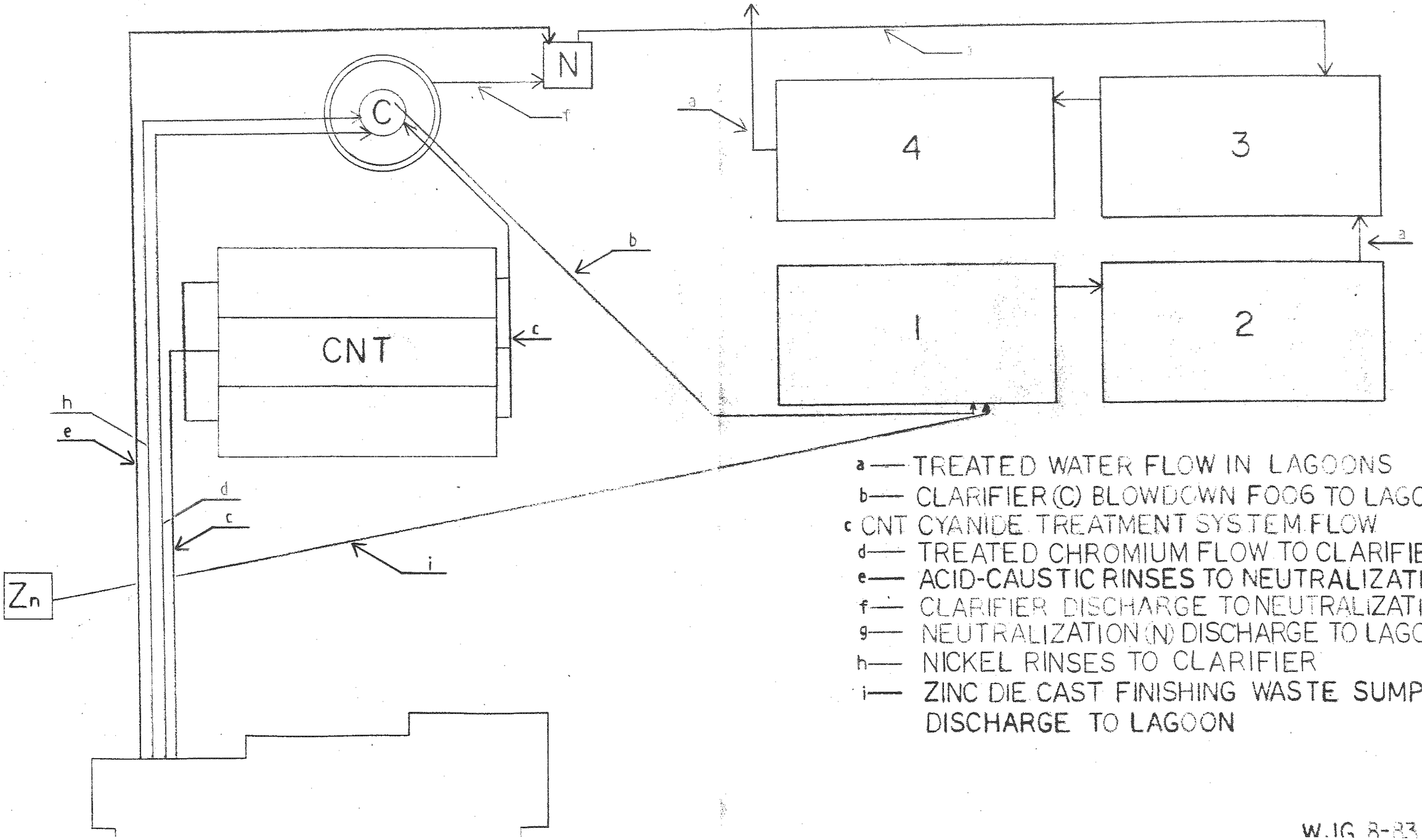
THE ESTIMATED SLUDGE GENERATION IS AS FOLLOWS:

AVERAGE MONTHLY	110.2	TONS
AVERAGE YEARLY	1322	TONS
MAXIMUM MONTHLY	119.9	TONS
MAXIMUM YEARLY	1439	TONS

A flow schematic of the treatment process is included with the petition.

STANLEY TOOLS - FOWLERVILLE EPA I.D.NO - MID 099124299

TREATMENT SYSTEM FLOW SCHEMATIC



a — TREATED WATER FLOW IN LAGOONS
b — CLARIFIER (C) BLOWDOWN FOOG TO LAGOON
c CNT CYANIDE TREATMENT SYSTEM FLOW
d — TREATED CHROMIUM FLOW TO CLARIFIER
e — ACID-CAUSTIC RINSES TO NEUTRALIZATION
f — CLARIFIER DISCHARGE TO NEUTRALIZATION
g — NEUTRALIZATION (N) DISCHARGE TO LAGOON
h — NICKEL RINSES TO CLARIFIER
i — ZINC DIE CAST FINISHING WASTE SUMP DISCHARGE TO LAGOON

W.IG 8-83

7. Discussion of Factors Delineated in Criteria for Listing Hazardous Waste:

Based on the established drinking water standards and the results of the EP Toxicity Extraction Procedure for Metals, the sludge generated at Stanley Tools - Fowlerville is non-hazardous even though hazardous waste constituents are treated. The metal characteristics of the sludge are far below the allowable concentrations for a toxic waste. The results show that the extract solutions meet the drinking water standards within the sensitivity of the test procedures. As a result of the treatment process, the metals are basically held in an immobile form and are not capable of posing a substantial present or potential hazard to human health or the environment when treated, stored, transported, or disposed of, or otherwise managed.

8. Sampling Methodology:

As discussed earlier under 2a, Sampling, the lagoons were sampled according to the sampling methodology devised by Mr. Morse, a copy of which is included in this petition. The sample dipper was constructed from a one-gallon plastic bottle with the neck cut off. The bottle was attached to a long wooden pole. The dipper was pulled through the sludge from top to bottom to obtain a representative cross section sample.

9. Sample Handling and Testing Methodology:

The samples were kept in sealed nalgene bottles at all times. At the time of testing, each sample was well mixed with a paddle mixer, and a portion of the sample slurry was drawn off using Tygon tubing and a vacuum line. The slurry was collected in pre-weighed 500 ml nalgene bottles which were covered to prevent evaporation losses. In all cases, over 100 grams of slurry was initially taken. A portion of the sample was tested for percent non-filterable solids, gravimetric method as described in, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 1310, Section 7.0.

The pH of the slurry was also measured at this time.

EPA ID #MID099124299

The remaining sample portions were subjected to the E.P. Toxicity Test Extraction Procedure as outlined in, "Test Methods for the Evaluation of Solid Waste Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 1310. A Millipore Hazardous Waste Filtration Unit using a pre-weighed 142 mm, 0.45 micron filter pad and nitrogen as the pressurizing gas was incorporated to achieve the solid-liquid separation. The liquid portion of the samples were collected in glass 500 ml Erlenmyer flasks and were stoppered immediately after the liquid flow ceased and the pressurizing nitrogen gas evolved from the filter unit. The liquid fractions from the initial separation were stored at $4^{\circ}C$ for future usage. The remaining solid portion was evaluated for particle size and then the solid along with the filter pad and the support screen were placed in a covered Petri dish and the solids were immediately weighed to the nearest 0.1 mg. The solid samples were then introduced into a suitable extractor along with sixteen times their weight of deionized water. The agitation was started and the pH of the solution was measured. In all cases, the initial pH measured was greater than pH 5.0 $\pm$ .2, therefore the pH was decreased using 0.5N acetic acid. After each acid addition, a 20 second equalization time was allowed and then the pH was recorded. Once again, in all cases, the maximum amount of 0.5N acetic acid (4 mls/gm of solid charged to the extractor) was added to the samples and the resultant pH never dropped near the pH 5.0 $\pm$ .2 range.

The agitation was continued for a twenty-four hour period during which the pH was measured. At the end of the twenty-four hour period, the pH was again measured and the agitation was stopped. The extracted solution was then introduced into a Hazardous Waste Filtration Unit and the solid and liquid portions were separated using a 142 mm, 0.45 micron filter pad and nitrogen gas for pressurization.

The resultant liquid was collected in a 1000 ml glass Erlenmyer flask and combined with the liquid obtained from the initial separation. The combined solution was preserved for metals analysis to a pH of less than 2 using nitric acid. The sample was analyzed for E.P. Toxic Metals by Atomic Absorption Spectroscopy, as outlined in the, "Test Methods for the Evaluation of Solid Waste, Physical/-Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Section 7.0.

Since the waste is both generated and disposed of in the State of Michigan, the elements copper and zinc were also analyzed since they are considered by the State of Michigan as EP Toxic Metals.

10. Testing Results:

The results of the E.P. Toxic Metals analysis analyzed by Atomic Absorption Spectroscopy using the methods of standard additions for quantification of the species concentration and the results of the percent solids determination are tabulated on the following pages. Each individual quadrant was analyzed separately for both total and leachable metals, also a composite sample was made up from all the samples taken and analyzed for both total and leachable metals. The total metal samples were reported in both percent by weight (on a dry weight basis) and in mg/l. Preliminary scans were run on each sample, the elements which gave absorption readings corresponding to concentrations far below the allowable limits were not quantitated by the method of standard addition techniques. The Atomic Absorption Unit was calibrated using both commercially prepared high purity atomic absoprtion cation standards and in-house prepared cation standards utilizing a metal or salt of the highest commercially available purity.

The sludge samples were prepared for analysis following the sample digestion methods outlined in, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 3050. All acid reagents used were of the trace metals analysis grade purity with the exception of the acetic acid which was reagent grade purity. The liquid samples were prepared for analysis following the sample digestion methods outlined in, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 3010. All glassware used was acid washed and rinsed prior to usage.

Sample preparation and analysis procedures performed by TRC Environmental Consultants (Outside Testing Laboratory) have been documented on their reports, and are in accordance with the testing references incorporated by Title 40 CFR Part 260.11 referenced in Title 40 CFR Part 261 Appendix III.

11. Names and Model Numbers of the Instruments Used:

a) TRC Environmental Consultants

1) Perkin Elmer Model 560 Atomic Absorption Spectrophotometer, equipped with background correction, and an electrodeless lamp power supply, and HGA-2200 furnace and a MHS-10 Mercury Hydride System.

b) Stanley Works Corporate Laboratory

1) Perkin Elmer Model 2380 Atomic Absorption Spectrophotometer, equipped with a background correction system.

2) Mettler H31 Electronic Balance with sensitivity to 0.1 mg.

3) Ainsworth Model 10N Electronic Balance with sensitivity to 0.1 mg.

EPA ID #MID099124299

4) Orion Model 501 Digital pH Meter.

5) Millipore Hazardous Waste Filtration Unit
Catalog No. YT30142HW.

6) Millipore 0.45 Micron Membrane Filters, 142 mm Diameter,
Catalog No. HAWP14250.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and, that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete, except for the cyanide analysis and the determination of the oil and grease content of the sludge which will be submitted in the second part of the petition. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

THE STANLEY WORKS

Richard H. Ayers
Group Vice President

jzz

STANLEY

THE STANLEY WORKS

Since 1843

P.O. Box 1800
NEW BRITAIN, CONNECTICUT 06050

(203) 225-5111

March 15, 1983

Mr. Myles Morse
Office of Solid Waste (WH-565)
U.S.Environmental Protection Agency
Washington, D.C. 20460

Re: Stanley Tools, Fowlerville,MI
EPA I.D.# MID-099124299

Dear Mr. Morse:

As per our phone conversation of March 10, 1983, I am sending you this letter to confirm the lagoon sampling methodology that we discussed. To summarize our conversation, our Michigan Tools facility is involved in the fabrication, plating, and finishing of zinc-die castings. The facility treats cyanide, hexavalent chromium, and nickel electroplating rinse waters in tanks. The blow down and underflow from our clarifier is directed to the first of four settling lagoons which are in series. The bulk of the solids settling occurs in Lagoon #1 while further settling is achieved in the remaining lagoons. The final discharge from Lagoon #4 is directed to a receiving stream under the guidelines of an NPDES Permit. The F006 waste remains in the lagoon for a period of time of about one year, before the lagoons are pumped down and the waste is sent for disposal.

The average dimensions of the lagoons are 60' wide x 80' long x 4' deep. We discussed that in order to obtain a representative sample from the lagoons, lagoons #1 and #2 should be divided into quadrants while lagoons #3 and #4 divided in two sections. From each quadrant or section, at least four grab samples will be collected. The samples will be taken in a manner that will cross-section the area of the quadrant or section being sampled. Each grab sample will be a representative sample of the buildup of sludge in the quadrant or section. The grab samples will then be composited and one composite sample from each quadrant or section will be obtained. Please see attached drawing.

Mr. Myles Morse
Re: Stanley Tools, Fowlerville, MI
EPA I.D.# MID-099124299

The composite samples will be analyzed for total metals along with total and amenable cyanide. The extract from the EP Toxicity Test will be analyzed for leachable metals.

If, in your opinion, the sampling methodology discussed above meets the requirements of 260.22H, please sign and date below and return a copy for our records. If the plan does not meet the requirements of 260.22H, please contact me at your earliest convenience.

Thank you for your cooperation with this matter.

Sincerely,

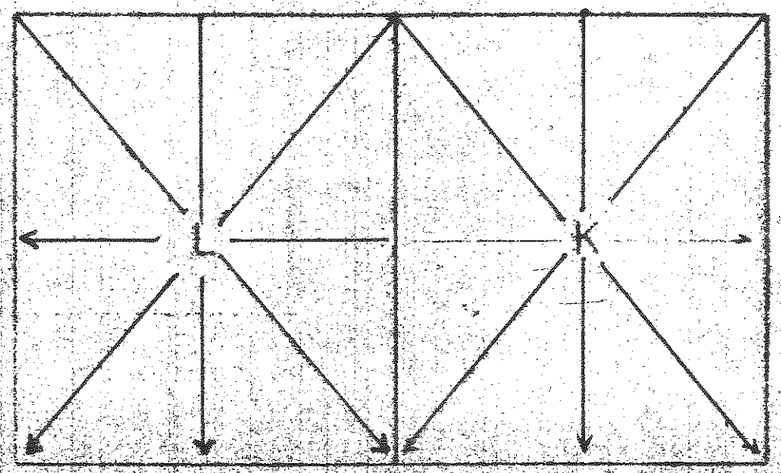
THE STANLEY WORKS

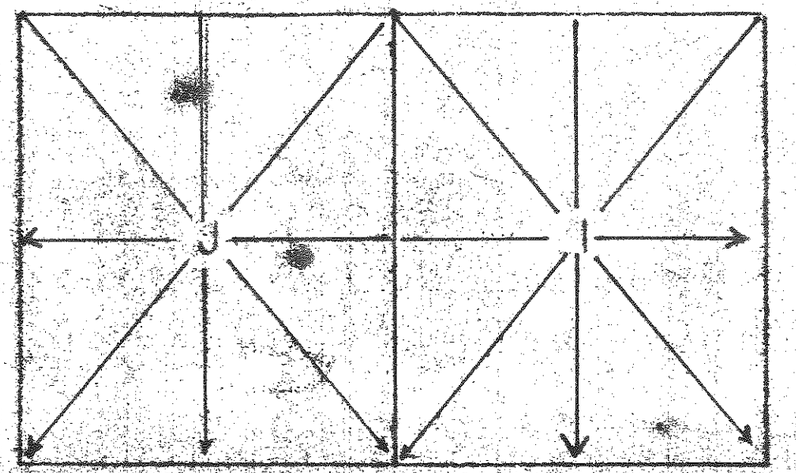
William J. Guerrera

William J. Guerrera
Environmental Chemist
Stanley Laboratory
1309 Corbin Avenue
New Britain, CT 06053

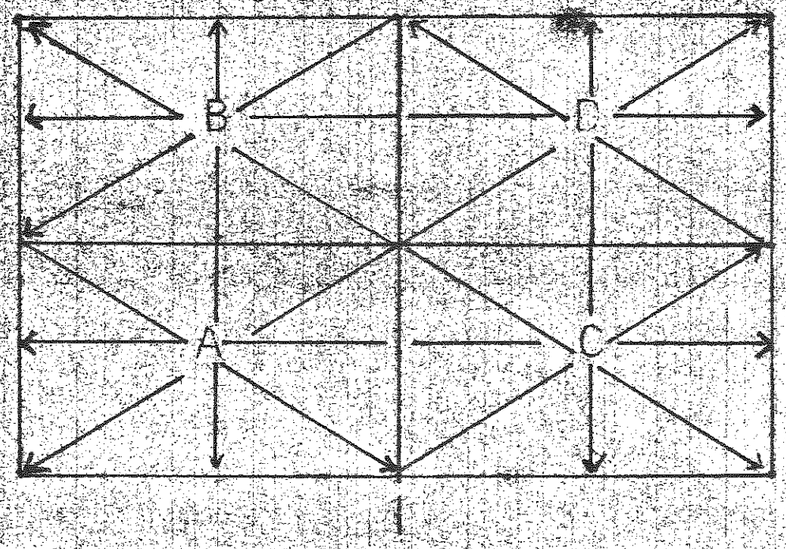
jzz

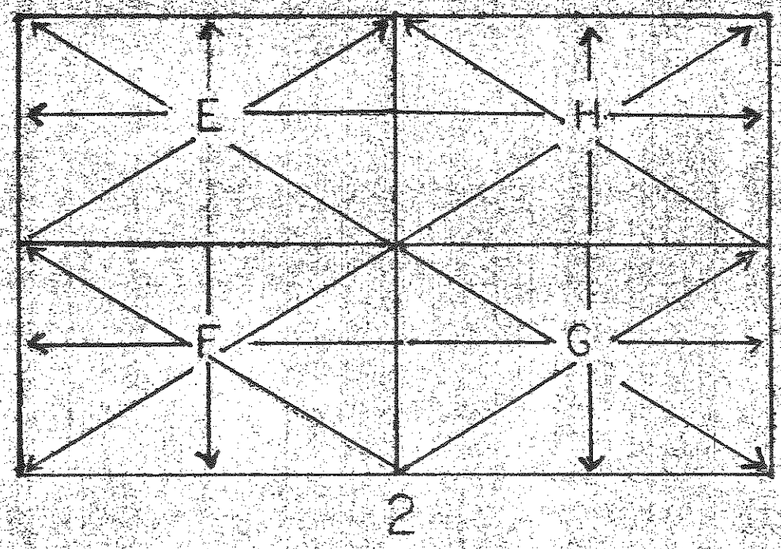
LAGOON SAMPLING METHODOLOGY





← ARROWS INDICATE DIRECTION IN WHICH SAMPLES WILL BE DRAWN





The analytical data presented on the following pages has been developed by TRC Environmental Consultants. A total metals analysis for Arsenic, Mercury, and Selenium was performed by TRC on sample #1299 which corresponds to composite sample M. The results of the analyses indicate that the levels of Arsenic, Mercury, and Selenium, on a % dry weight basis are below the detection limits given. Arsenic and Selenium were not analyzed in the leachate since their levels from the total metals analysis were so low that if all the metals were leachable, they would still yield levels less than the E.P. Toxicity limits.

An exception was made for mercury, since signal supression from matrix interference yielded a level of mercury in the total metals analysis which could be E.P. Toxic, mercury was analyzed in the leachate. The leachate analysis indicated that the mercury content was significantly less than the E.P. Toxic limits.

TRC Environmental Consultants, Inc.

800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631

April 29, 1983

Mr. William Guerrera
Stanley Laboratory
The Stanley Works
New Britain, CT 06053

Dear Bill:

TRC Project 2150-B51-09
P.O. 27726L

The results of the analysis by Method of Addition of Sludge sample #1299 are as follows:

% solids	3.16%
Arsenic	non-detected <2.72 µg/g (dry weight basis)
Mercury	non-detected <5.89 µg/g (dry weight basis)
Selenium	non-detected <5.44 µg/g (dry weight basis)

The sample was prepared and analyzed using methods given in Standard Methods for the Examination of Water and Wastewater 15th Edition, 1980 APHA-AWWA-WPCF and "Methods for Chemical Analysis of Water and Wastes" (EPA-600/4-79-020, March 1979). Standard Methods Procedure 302H "Digestion of Sludge with High or Refractory Organic Content" was followed for the preparation for Arsenic and Selenium analysis. The sludge was prepared for mercury analysis by an aquaregia-permanganate digestion similar to EPA Method 245.5. Matrix effects caused suppression of the signal for the three metals.

Arsenic was analyzed by the EPA Furnace Method 206.2. First the original digestion solution was used for the Method of Addition procedure but results were inconsistent due to the sample matrix and/or acid concentration. The sample was diluted five-fold and then analyzed without interference or suppression of the signal. The result, calculated by linear regression using three points from the Method of Addition, was below the limit of detection.

Mercury was analyzed by cold vapor generation following the Perkin-Elmer procedure for the MHS-10 Mercury-Hydride System. The sample matrix caused approximately 70-fold suppression of the mercury signal. The result, calculated by linear regression using four points from the Method of Addition, was below the limit of detection.

Selenium was first analyzed by hydride generation. However, severe suppression of the signal occurred and this method was abandoned and EPA Method 270.2 was used instead. A five-fold dilution of the sample was used for Method of Addition which still gave about 20% suppression of the signal. The result, calculated by linear regression using three points of the Method of Addition was below the limit of detection.

I am enclosing copies of the notebook pages and charts for this sample. If you have any questions about this analysis please do not hesitate to call.

Sincerely,

TRC ENVIRONMENTAL CONSULTANTS, INC.

Margaret F. Flanagan

Margaret F. Flanagan
Senior Chemist

MFF/jjs
Enclosures

TRC

Project No. 4150-154/
Book No. MM-6 TITLE Stanley-116A-Selenium-Furnace

From Page No. ____

4-27-83

ELEMENT Se FLOW TIME 3 Stop
WAVE LENGTH 196.0 TUBE TYPE non-pyro
SLIT 0.7 DRY 125 ° 22 sec 10 ramp
GAS Ar CHAR 1200 ° 25 sec 10 ramp
DIV. 3s ATOM 2700 ° 7 sec ____ ramp

Stanley prepared 4-27-83 ABB 1 p36 in 0.5% HNO_3

Do 1.0 ml add 20 µl 5% HNO_3 and 20 µl 30% H_2O_2

301	0.0 ppb Se		Response		
2	100.0		-0.009		
3	50		0.875 → 100.0	Limit of det	$\frac{100}{.875} \times .02 = 7.27$
4	20		54.1		
5	0.0		23.8		
6	100.0		1.2		
			102.9 → 100		
7	EPA-WS-12-Blank	125 → 25	9.9	$\times \frac{25}{125}$	2.0 ppb
8	1	125 → 25	69.4	$\times \frac{25}{125}$	13.88 − 2.0 = 11.9 ppb
9	2	125 → 25	overload		
10	0.0 ppb Se		3.9 → 0.0		
				4pt. Linear Reg.	(3pt)
11	Stanley Sludge (16-0) MyA Dilution	1 → 5 +0.0 ppb Se	4.7	corr	0.4983 0.9998
12		+50.0	20.6	Slope	0.299 0.33
13		+100.0	37.7	y int	5.72 4.5
14		+200.0	64.4	if $y=0$, $x=$	-19.2 (-13.6)
			< 13.6 µg/l	× $\frac{0.100}{1.25}$	× 5 = <5.44 µg/l
15	EPA (2)	100 → 100	66.4 − 2.0 = 64.4 ppb Se		
16	Sludge Blank MyA	No Std 0+0	-4.3	corr	0.9995
17	Sludge Blank	0+100	21.1	Slope	0.245
18		0+200	44.7	y int	-4.0
19	↓			if $y=0$, $x=$	+16.3

To Page No. ____

Witnessed & Understood by me,	Date	Invented by Margaret A Blevins	Date
		Recorded by	4-28-83

n Page No.

% Solids

wt dry dish + shaken slurry sample = 81.9349
wt dish = 59.2126

wt sample (wet) = 22.7023

Dried @ 100° C overnite

Take 3 wts that agree w/in 1%:

wt of dish + dried sludge: 59.9472
59.9493
59.9508

avg = 59.9491
wt dish = 59.2326
wt dry solids = 0.7165

% dry solids = $\frac{0.7165}{22.7023} \times 100 = 3.16\%$

To Page No.

Witnessed & Understood by me, M. Blanchard Date 4-28-80

Invented by A. Lee Date 4-10-80

From Page No. _____

Acid Digestion

Sample 1 (Dish #8)

Dry wet sample + dish = 110.7585
wt of dish = 67.9671
wt of wet sample = 42.7914 × 0.0316 = 1.35 g wt of dry sample

Sample 2 (Dish #16-0)

wt of wet sample + dish = 108.2967
wt of dish = 68.6183
wt of wet sample = 39.6784 × 0.0316 = 1.25 wt of dry sample

Sample 3 (Dish #17) For spike

wt of wet sample + dish = 110.6937
wt of dish = 68.5669
wt of wet sample = 42.1268 × 0.0316 = 1.33 wt of dry spike sample

Add 50 µl of 100 µM As
Add 50 µl of 100 µM Se
} = 50 p/g spike when samples are brought up to 100 mls

Sample 4 (Dish #Blank)

Reagent Blank

Samples evaporated on hotplate to ~2.0 mls. Add 1 mL 1:1 HNO_3 + 1 drop of HF evaporate to near dryness, & repeat HNO_3-HF addition to get rid of organics.

Add 20 mls HCl 0.1, trace, finally to 100 mls w/ dH_2O

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	4-19-83

4-27-83

Standard prep 3/83 #125/31/p12

ELEMENT As FLOW TIME 3-Step

WAVE LENGTH 193.7 EDL 8 mA TUBE TYPE Non-spec

SLIT 0.7 DRY 125 ° 22 sec 10 ramp

GAS Ar CHAR 1000 ° 25 sec 10 ramp

DIV. 3 vols ATOM 2700 ° 7 sec — ramp

Limit of detection

$\frac{100}{1125} \times .02 = 6.8$ ppb As

for 1→5 dil = 3%

for 5→1 conc = 1.36

To 1.0 ml of sample add 0.02 ml of 5% HNO_3

Cup #	Sample	Prep	Response
401	0.0 ppb As		0.1025 → 0.100
02	100.0		0.225 ⇒ 100.0
3	50.0		42.0
4	20.0		21.3
5	0.0		-5.14 ⇒ 0.0
.	100.0		106.6 → 100.0
7	EPA WP12 - Blank	125→25	-0.2 nd < $6.8 \times \frac{25}{125}$ = < 1.36 ppb
8	①		6.12 $\times \frac{25}{125}$ = 122 ppb As
9	②		overcal
10	③	100→100	18.4 18.4 ppb
11	0.0 ppb As		-0.9
12	Stanley-Sludge (Acid 16-0)	1→5 dilution	+0 ppb 1.3 curve 0.9848 0.9996 (3 pts)
13			+50 87.1 slope 0.6284 0.493
14			+100 50.6 y-int -2.83 1.68
15			+150 98.2 if y=0, x = +4.5 -3.4 = nd < 6.8
16	0.0		7.2 → 0.0
17	100.0		92.5 → 100.0
18	EPA WP12 ②	125→25, 1→2	88.0 $\times \frac{25}{125} \times \frac{2}{1}$ = 35.2 ppb As
19	Stanley 16-0 +0		
20	+100 +150		} omit
21	+100		} matrix too high without dilution

$< \frac{6.8 \text{ ug}}{\text{l}} \times \frac{0.100 \text{ l}}{1.125 \text{ g}} \times \frac{5}{1} \text{ dil}$ nd < 2.72 ug/g

Witnessed & Understood by me, Date

Invented by Margaret D. Pleasance Date 4-28-83

Recorded by

om Page No. 74

As - Blank Analysis only

Std / 0, 100, 50, 20 ppb As in 0.5% HNO3 (AR3600 12 3-(83 MF)

Reagent / to 1 ml Sample add 0.02 mls 5% Ni(NO3)2

~~Standby of EP Testing~~

Standby must be done by method of addition

ELEMENT As FLOW TIME 3-Step

~~WAVELENGTH~~ 193.7 EDL 8 WU TUBE TYPE non-flow filter in

0.7 calc DRY 125 ° 45 sec 10 ramp

Ar CHAR 1000 ° 45 sec 10 ramp

DIV. 10 dil'n ATOM 2700 ° 7 sec — ramp

Cup #	Sample	dilution	Response	Ppb As
101	0.0	ppb As		
2	100.0			
3	50.0			
4	20.0			
105	0.5 mls Stanly Blank	+ 0.5 mls	0 ppb As	
6		+ 0.5 mls	20	
7		+ 0.5 mls	50	
8		+ 0.5 mls	100	
109	0.5 mls Sample (1)	+ 0.5 mls	0 ppb As	
10		+ 0.5 mls	20	
11		+ 0.5 mls	50	
12		+ 0.5 mls	100	

Note, see note p. 76

To Page No. 75

Witnessed & Understood by me, Date

Invented by [signature] Date 4-27-92

Recorded by

Page No.__

Sample	dilution	response	ppb As
WPO 14 EPA TM blank		1.9	<6.9 ncl
" ①			
" ②			
0.5 mls standby blank + 0.5 ml 0 ppb As	1→5	3.7	corr = 0.9897
	20	13.5	slope = 0.52
	50	28.1	y-inter = 2.13
	100	55.9	y=0 x=-4.14 (nd)
			x5 = 20.7
			= <34.5 ng/ml
0.5 mls sample ① + 0.5 ml 0 ppb As	1→5	4.4	corr 0.9989
dry wt = 1.35 g	20	36.4	slope = 0.59
	50	50.0	y-inter = 15.00
	100	68.8	y=0, x=-25.6
			x5 = 128 ng/ml
			Repeated 948.1 ng/g = 9.48 ug/g
0.5 mls spike sample + 0.5 ml 0 ppb As	1→5	7.5	corr 0.9983
dry wt = 1.33 g	20	26.0	slope = 0.52
+ 50 ppb As spike	50	38.0	y-inter = 11.36
set aside extract to see spike	100	61.7	y=0, x=-22.02
			x5 = 110.1 ng/ml
			= 8278 ng/g = 8.28 ng/g

(diluted 1→5, then anal again; final result shows good agreement)

0.0 ppb As		7.0
100.0 ppb As		44.8

calc

+ conc. of added std (i.e. 0, 20, 50, or 100) plus response into LR — 0, and x, then times (as 1→5 dilution) gives conc. of As in sample in ng/ml

x 100 = ng in sample

÷ sample wt (1.74) = ng/g
(dry)

Read & Understood by me, | Date | Invented by | Date

Book No. AM-(2) TITLE Hg digestion for sludge ...

From Page No.

Mercury Digestion

1, left

3607

1) wet weight sample 1 = 11.4149 g wet = ~~0.3765~~ g dry

2) wet weight sample 2 = 12.4189 g wet = 0.3924 g dry

3) wet weight spiked sample (1200 ng Hg) = 11.8837 g wet

+ 2 Blanks

Standards

WS I = 1 ppm Hg | 1000 ug/ml + 0.1 ml → 100 mls = 1 ppm Hg = 1 ng/ul

WS II = 0.1 ppm Hg | 1 ug/ml + 5 mls → 50 mls = 0.1 ppm Hg =

mls WS II in final vol. of 100 mls	total ng Hg	ng/ml Hg
0.0 mls	0 ng	0 ppb
0.5	50	0.5
1.0	100	1.0
2.0	200	2.0
5.0	500	5.0
10.0	1000	10.0

Procedure

Add 5 mls aqua regia. Heat 2 minutes @ 95°C in constant temp H_2O bath - Cool

Add 15 mls 5% $KMnO_4$ solution. Heat for 30 min @ 95°C in const. temp. H_2O bath - Cool

Add 6 mls sodium chloride-hydroxylamine sulfate soln (12 g of each mixed together → 100 DI H_2O)

Dilute to 100 mls, Try a 10 ml aliquot by hydride

[Method of addition -- actually, it wasn't necessary to run the standards above, since we will be run MOA]

To Page No.

Witnessed & Understood by me, Margaret ... Flanagan | Date 4-26-83 | Invented by [signature] | Date 4-25-83

Recorded by

No.

Mercury Cold Vapor

samples were digested as on p. 78, no acid or KMnO4 treatment required (as on p. 66)

% NaBH4
% NaOH

& conditions

Hg EOC 5 units
VL : 20 psi
: 253.6
IV : 0.7 abs
ration : 5.000
: 0.5 Lpm
ode : cont
1.00
ecorder : TC
gnal : conc
ink out

Recorder
: 10 mV
Speed : 1 cm/min.

Try using a 10 ml aliquot or sample (not taken thru digestion procedure)
add 0 ng, 25 ng, 50 ng, & 75 ng Hg (0, 25, 50, & 75 ml of 1 ppm std) for
method of addition. Run first purge system with
blank taken thru digestion procedure, then system
with 10 ml 10% standard taken thru digestion
procedure

Sample	Aliquot, ml	cal	ng Hg in aliquot	ng/g (conc) Hg
Blank + 0 ng Hg ①	10.0	10.0	corr: 0.9913	
+ 25 ng Hg ②		22.0	m: 0.91	
+ 50 ng Hg ③		40.5	y-inter: 7.25	
+ 75 ng Hg ④		63.0	0.2nd: -0.21	
			1.01 ng/ml	
Sample 1 + 0 ng Hg ①	10.0	3.0		
+ 25 ng Hg		2.0		
+ 50 ng Hg		2.0		
used - from dil of sample 1, use range 2				
1 + 250 ng Hg		3.5		
1 + 2500 ng Hg ②	10.0	39.5		

To Page No.

d & Understood by me, | Date 4-26-83 | Invented by | Date 4-25-83

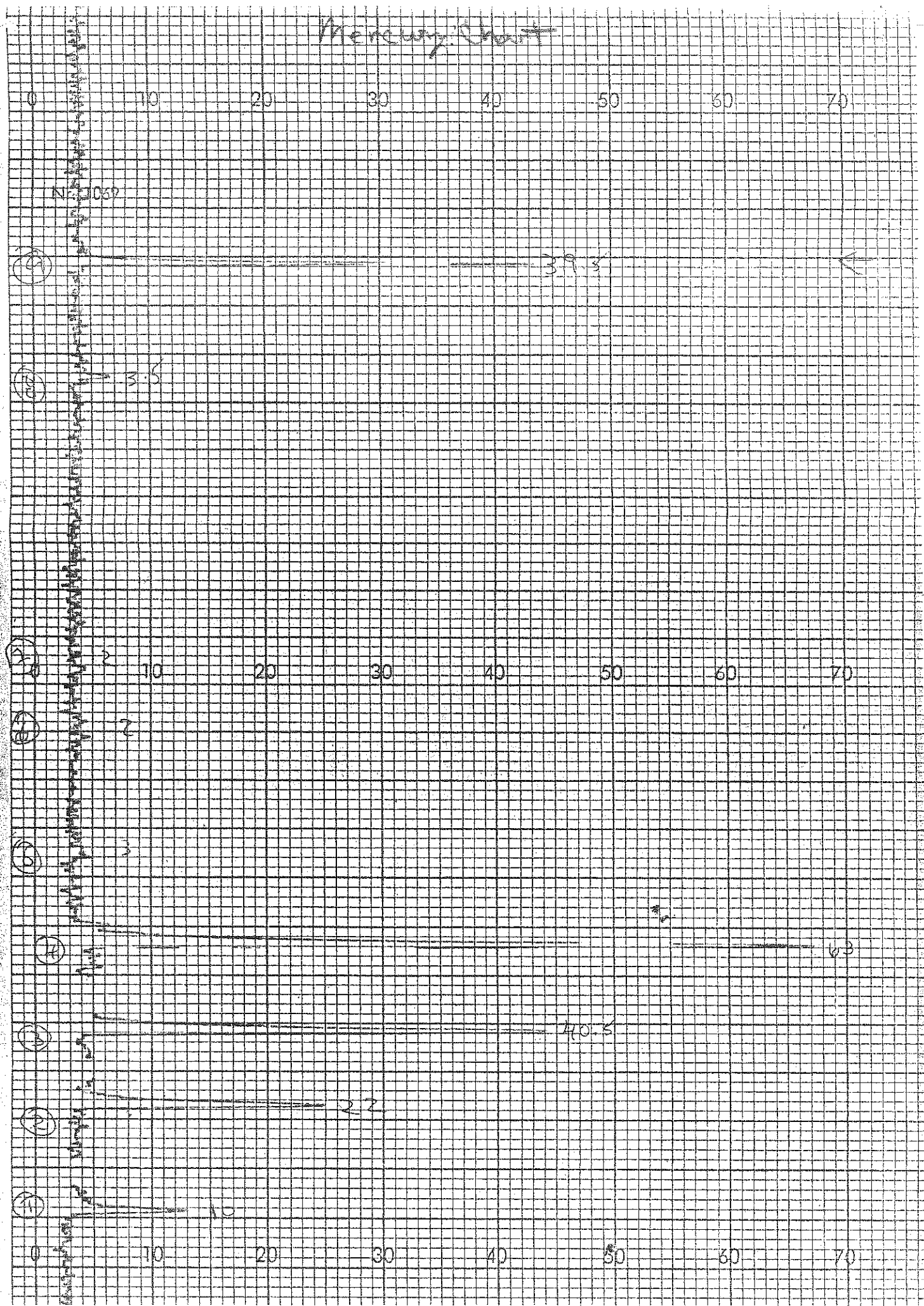
Project No. [illegible]

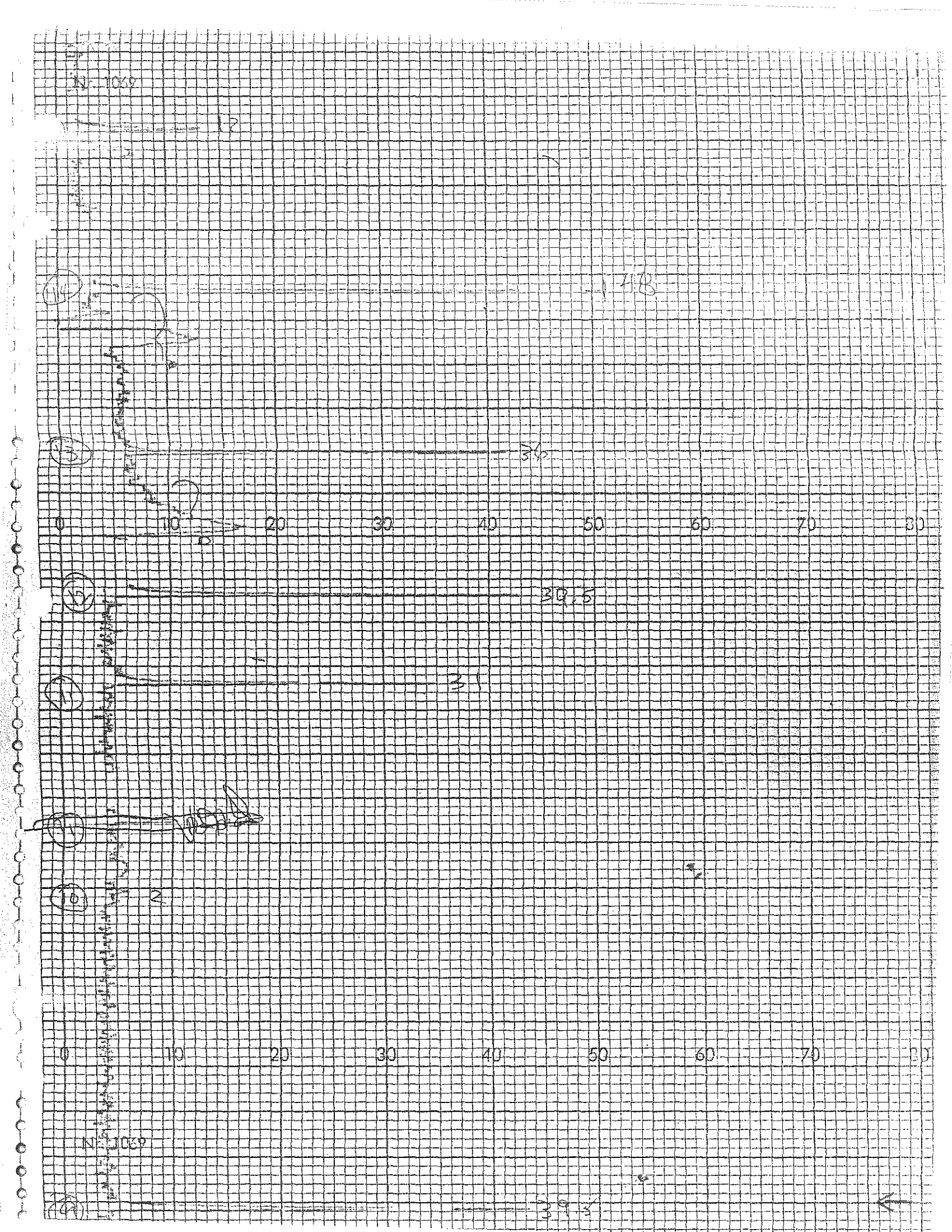
Book No. Anc (1) TITLE Hg, conc - Sewage, EPA (1)

Page No.

Sample		Aliquot		ng Hg in aliquot	ng/g (ppm) Hg
Sample	0 ng Hg (1) (A)	10.0	2.0	LR: 5 points	LR-4 pts 1-D
	1250 ng Hg (2) (B)		31.0	corr = 0.9132	r = 0.9937
	3750 ng Hg (3) (C)		39.5	r = 0.906	m = 0.0103
	5000 ng Hg omit		36.0 omit	y int = 2.40	y = 2.39
	8000 ng Hg (4)		48.0	0.232x = -1.679	0.27 = -231
	10000 ng Hg (5) (D)		12.0	or 167.7 ng/ml	42737 ng/g

Repeat 4pt: $\frac{231 ng}{10 ml} = \frac{23.1 ng}{ml}$ or $\frac{5667 ng}{9} = \frac{<589 ng}{g}$ (dry wt)


Mercury Chart
0
10
20
30
40
50
60
70
N: 039
39.5
33.5
63
40.5
22
10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80
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(9)
39
t

TRC Environmental Consultants, Inc.

800 Connecticut Boulevard
East Hartford, Connecticut 06108
(203) 289-8631

August 16, 1983

Mr. William Guerrera
Stanley Laboratories
The Stanley Works
New Britain, Connecticut 06053

Re: TRC Project 2150-B51-15
P.O. C 28684 L

Dear Bill:

The concentration of mercury in EP toxicity Leachate #1299 is 0.0027 µg/ml. The sample and lab blank were analyzed by method of additions on August 9th by Anne Levine. Mercury was analyzed by the Cold Vapor Technique using Perkin-Elmer Method EN-1 for the MHS-10 Mercury Hydride System on the Perkin Elmer 560 Atomic Absorption Unit. Each response was recorded and peak height was used for the calculations. The responses were corrected for the blank and then linear regression was used to calculate the result. X was the nanograms added to the sample and y was the blank corrected peak height. The x-intercept equalled the ng mercury in the aliquot analyzed. I have enclosed copies of the notebook pages and chart.

If you have any questions about the analysis please do not hesitate to call.

Very truly yours,

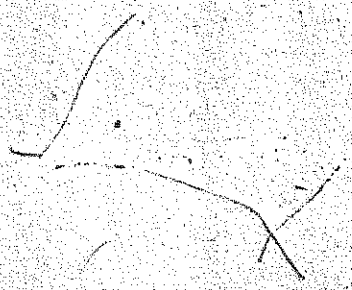
TRC ENVIRONMENTAL CONSULTANTS, INC.

Margaret F. Flanagan

Margaret F. Flanagan
Senior Chemist

MFF/jjs

Enclosures



Project No. ...

Book No AN-(3) TITLE Hg - Hydride - Stanley

From Page No.

1% $NaBH_4$ 1 g → 1 L

1% NaOH 5 g

Hg EDL - Stands Fibre

NL: 20 mA

λ - 253.6 slit: 0.7 nm

mode: conc

BA - BG

signal: area

Expansion: 3.5

t: 0.5

recorder: Tc

1000 mg/mL × 0.1 mL → 100 mL = 1 mg/mL

= 1 ng/µL

× 1 mL → 100 = 10 mg/mL . 10 ng/µL

— Take suitable aliquot, swell to 10 mL

— Add 1 mL 30% HNO_3 - 30% (v/v)-HCl

— Add 5% $KMnO_4$ drop wise till purple persists.

— Run all by MOA,

$\frac{\text{ng in aliquot}}{\text{aliquot}}$: ng/mL Hg

Book No. AMC 3 TITLE Hg - Stanley et al

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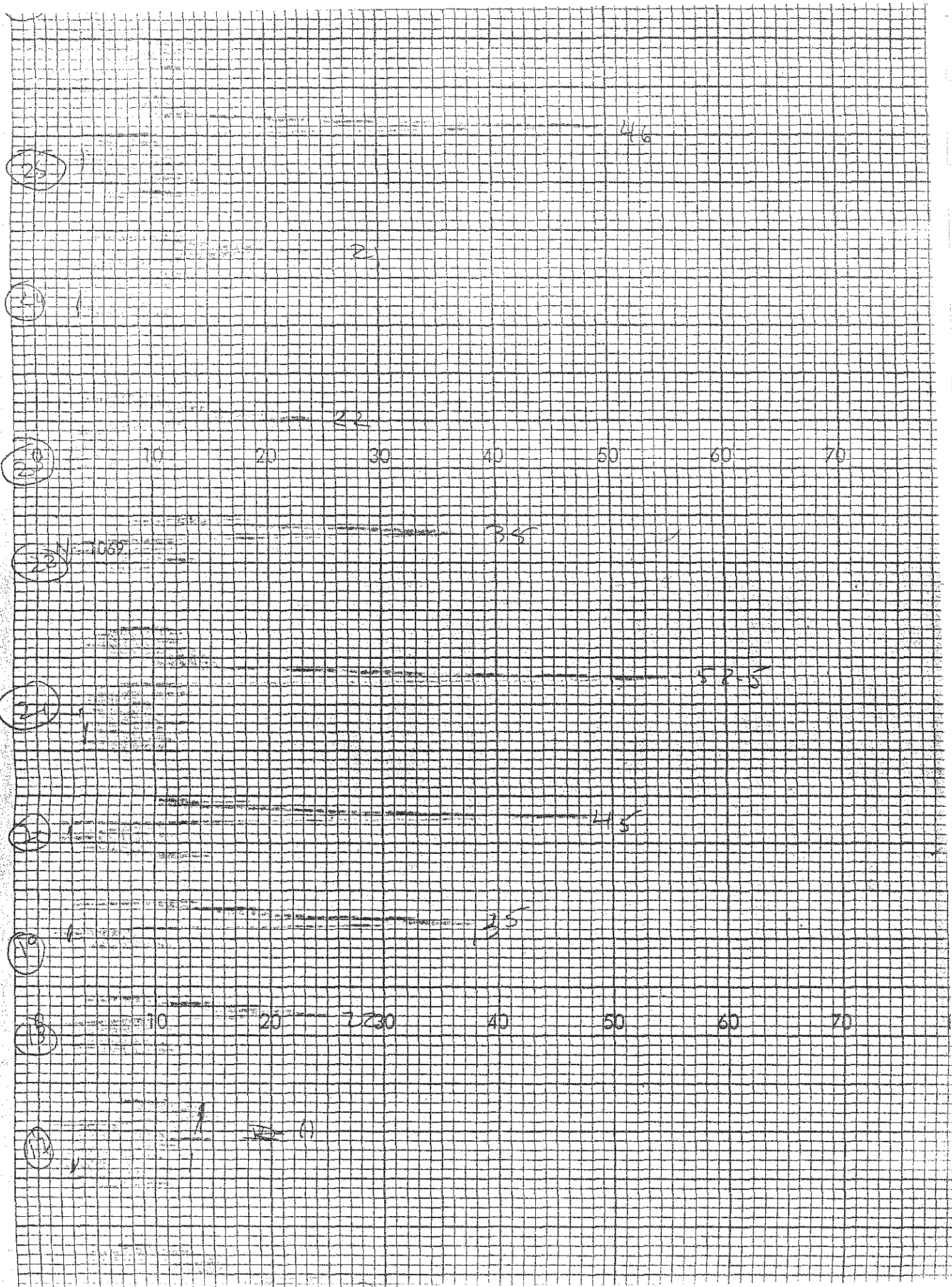
Run	Sample		cd	cd-blank	
17	0	ng Hg	11.0		
18	25		22.0		
19	50		35.0		
20	75		45.0		
21	100		52.5		
22	same as run #15 (50 ng undigested)		35.0		
23	" " " #16 (50 ng digested)		22.0		
24	5 mls Stanley	+ 0 ng Hg	21.0	11.0	r: 0.9591
25		+ 100	46.0	36.0	m: 0.382
26		+ 50	29.0	19.0	y-int: 5.1
27		+ 150	79.0	69.0	x: -13.4
					2.67 ng/ml
28	5 mls Blank	+ 0 ng Hg	10.0	0.0	r: 0.9992
29		+ 50	33.0	23.0	m: 0.487
30		+ 75	38.0 - omit	28.0	y: -0.583
31		+ 100	59.5	49.5	x: +1.2
					< 1 ng/ml ND
32	1 ml Sargasso (A)	+ 0 ng Hg	11.0		< 500 ng/ml
33		+ 100	10.0 - omit		
34	0	+ 1000 ng	48.5		ND
35		+ 500	23.0		

To Page

Witnessed & Understood by me,	Date	Invented by	Date
M. Allen Mazian	8-11-83		8-9-83
		Recorded by	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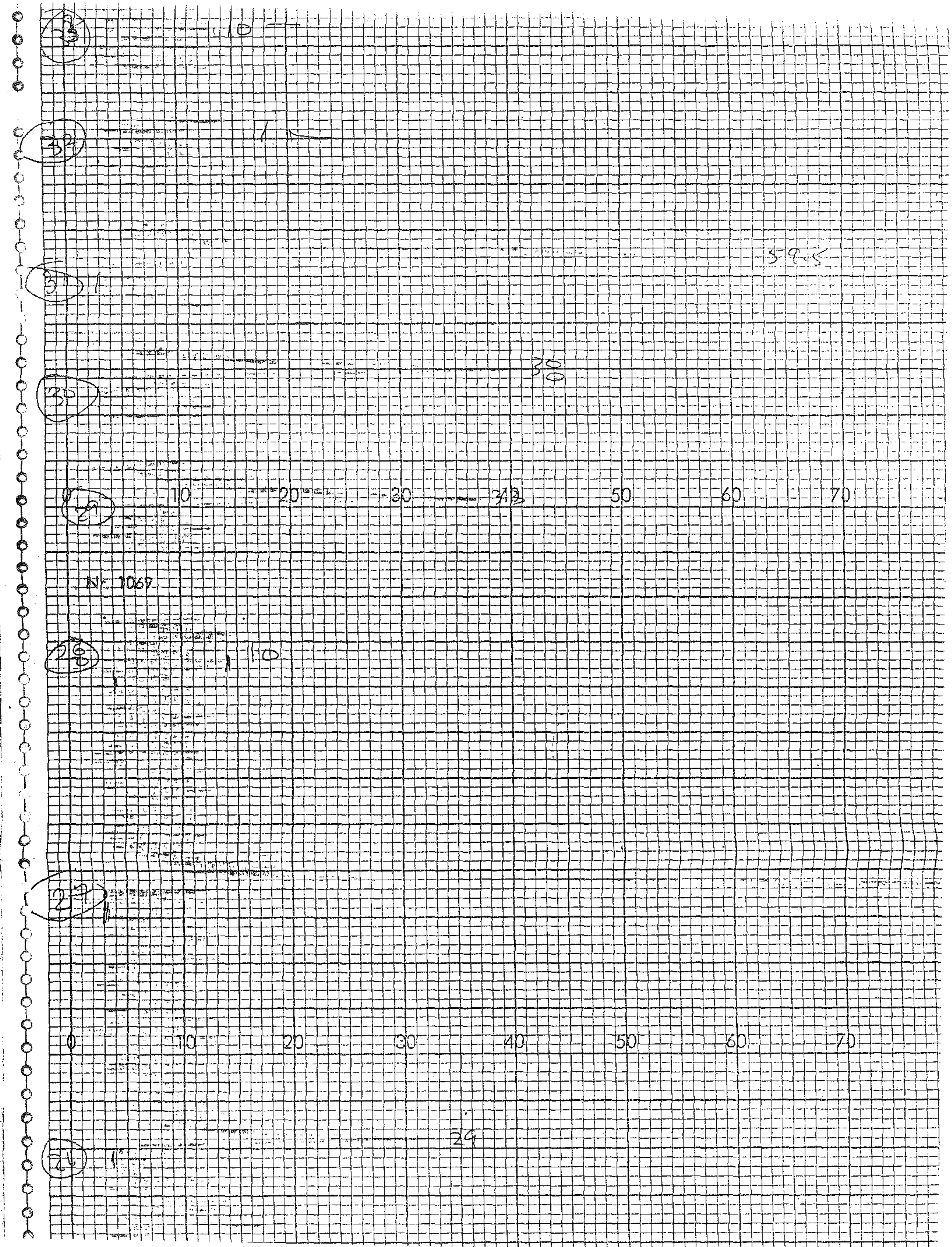

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DETERMINATION OF ARSENIC, SELENIUM AND MERCURY IN DRINKING WATER

SCOPE

This method describes the determination of As, Se and Hg in drinking water in concentrations above 1 µg/l. This method is also suitable for determining Bi and Sb.

OPERATING PARAMETERS

Element	As	Se	Hg	
Source	EDL	EDL	EDL	
Wavelength (nm)	193.7	196.0	253.6	
Slit Setting (nm)	0.7	2.0	0.7	
Purge Gas	Ar/N_2	Ar/N_2	Ar/N_2	
Background Correction	No	No	No	
MHS-1 Program	HYD I	HYD IV	Hg III	
Cell Temp.	900 °C	900 °C	200 °C	
Reductant (2.5 ml)	5% $NaBH_4$ 2% NaOH	5% $NaBH_4$ 2% NaOH	5% $NaBH_4$ 2% NaOH	
MHS-10 Cell Heating	Air/C_2H_2	Air/C_2H_2	-	
Reductant	3% $NaBH_4$ 1% NaOH	3% $NaBH_4$ 1% NaOH	3% $NaBH_4$ 1% NaOH	

INTERFERENCES

No interferences have been reported.

REAGENTS

30% hydrochloric acid

5% potassium permanganate solution

1.5% ; 30% nitric acid

1.5% ; 30% sulphuric acid

All reagents of Analytical Reagent (AR) grade.

STANDARD SOLUTIONS

0.002	0.004	0.008 µg As/ml	
0.002	0.004	0.008 µg Se/ml	
0.001	0.002	0.004 µg Hg/ml	(diluent: 1.5% HNO_3 + 1.5% H_2SO_4 solution)

10-ml aliquots used for calibration.

SAMPLE PREPARATION

For As and Se determinations, 10-ml sample aliquots are dispensed into the reaction flask and acidified with 500 µl 30% HCl.

For Hg determinations, 10-ml sample aliquots are dispensed into the reaction flask and acidified with 500 µl 30% HNO_3 and 500 µl 30% H_2SO_4. To oxidize any organically-bound Hg, 5% $KMnO_4$ solution is added dropwise until the violet colour just remains. At least 30 s should elapse before the determination is performed.

ANALYSIS

10-ml sample aliquots are normally used for all determinations.

To determine lower concentrations, sample aliquots of up to 50 ml may be used. To prepare calibration plots, the standard solutions should be correspondingly diluted. The acid content must be increased appropriately.

CALCULATION

The standard solutions have concentrations corresponding to:

2, 4, 8 µg As/l

2, 4, 8 µg Se/l

1, 2, 4 µg Hg/l

The concentration of each metal in the sample can be obtained by direct comparison to the standard calibration plot.

The analytical data presented on the following pages has been developed by the Stanley Works Corporate Laboratory. Included in the data is an E.P. Toxicity summary sheet on all the samples analyzed; individual data sheets detailing both Total and Extractable metal values for each sample; and the analytical data derived by the method of standard additions for both Total and Extractable metals.

As stated earlier in the petition, metals which yielded absorbance values corresponding to concentrations below the allowable limits, were not quantified by the method of standard additions. The metals barium and silver consistently yielded low absorbance values and were not quantified. Cadmium and lead also yielded low absorbance values but due to the low E.P. Toxicity limits placed on these metals and since they could be present in electroplating operations at the facility, the leachate samples were quantified by the method of additions.

ANALYSIS DATA

STANLEY TOOLS - FOWLERVILLE
EPA ID #MID099124299

E. P. TOXICITY EXTRACTION RESULTS SUMMARY mg/l

SAMPLE	ARSENIC	BARIUM	CADMIUM	CHROMIUM TOTAL	COPPER	LEAD	MERCURY	NICKEL	SELENIUM	SILVER	ZINC
A	N.A.	5.0*	0.02*	0.05*	0.38	0.05*	N.A.	1.60	N.A.	0.02*	0.85
B	N.A.	5.0*	0.02*	0.05	0.70	0.05*	N.A.	4.50	N.A.	0.02*	10.5
C	N.A.	5.0*	0.02*	0.05*	0.50	0.05*	N.A.	2.70	N.A.	0.02*	7.10
D	N.A.	5.0*	0.02*	0.05*	0.38	0.05*	N.A.	1.33	N.A.	0.02*	1.05
E	N.A.	5.0*	0.02*	0.05*	0.23	0.05*	N.A.	1.45	N.A.	0.02*	1.71
F	N.A.	5.0*	0.02*	0.05*	1.05	0.05*	N.A.	8.20	N.A.	0.02*	17.6
G	N.A.	5.0*	0.02*	0.05*	0.20	0.05*	N.A.	0.63	N.A.	0.02*	3.25
H	N.A.	5.0*	0.02*	0.05*	0.20	0.05*	N.A.	4.87	N.A.	0.02*	14.5
I	N.A.	5.0*	0.02*	0.32	0.32	0.05*	N.A.	6.25	N.A.	0.02*	0.70
J	N.A.	5.0*	0.02*	0.05*	0.38	0.05*	N.A.	9.50	N.A.	0.02*	5.5
K	N.A.	5.0*	0.02*	0.05*	0.40	0.05*	N.A.	1.95	N.A.	0.02*	0.94
L	N.A.	5.0*	0.02*	0.05*	0.20	0.05*	N.A.	6.20	N.A.	0.02*	2.20
M	N.A.	5.0*	0.02*	0.05*	0.37	0.05*	0.0027	0.95	N.A.	0.02*	2.65

N.A. - Not analyzed for in the extractable metals sample since they are not used in our process and total constituent analysis of composite indicates a level below the given detection limits.

* Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample A Lagoon # 1

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. - < 0.10%	N.D. - < 5.0
Cadmium	N.D. - < 0.0004%	N.D. - < 0.02
Chromium, Total	2.40%	N.D. - < 0.05
Copper	3.86%	0.38
Lead	N.D.- < 0.001%	N.D. - < 0.05
Mercury	N.A.	N.A.
Nickel	2.74%	1.60
Selenium	N.A.	N.A.
Silver	N.D. - < 0.0004%	N.D.- <0.02
Zinc	2.80%	0.85
pH	9.54	
% Solids -	4.25%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample B Lagoon # 1

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. - < 0.10%	N.D. - <5.0
Cadmium	N.D. - < 0.0004%	N.D. - <0.02
Chromium, Total	1.70%	0.05
Copper	3.24%	0.70
Lead	N.D. - < 0.001%	<0.05
Mercury	N.A.	N.A.
Nickel	1.80%	4.50
Selenium	N.A.	N.A.
Silver	N.D. - < 0.0004%	N.D. - <0.02
Zinc	4.00%	10.5
pH	9.12	
% Solids -	3.57%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample C Lagoon # 1

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. - <0.10%	N.D. - <5.0
Cadmium	N.D. - <0.0004%	N.D. - <0.02
Chromium, Total	5.60%	N.D. - <0.05
Copper	2.54%	0.50
Lead	N.D. - <0.001%	N.D. - <0.05
Mercury	N.A.	N.A.
Nickel	1.80%	2.70
Selenium	N.A.	N.A.
Silver	N.D. - <0.0004%	N.D. - <0.02
Zinc	3.74%	7.10
pH	9.20	
% Solids -	10.28%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample D Lagoon # 1

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. - <0.10%	N.D. - <5.0
Cadmium	N.D. - <0.0004%	N.D. - <0.02
Chromium, Total	5.60%	N.D. - <0.05
Copper	1.52%	0.38
Lead	N.D. - <0.001%	N.D. - <0.05
Mercury	N.A.	N.A.
Nickel	2.30%	1.33
Selenium	N.A.	N.A.
Silver	N.D. - <0.0004%	N.D. - <0.02
Zinc	2.80%	1.05
pH	10.50	
% Solids -	2.63%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample E Lagoon # 2

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. - <0.1%	N.D. - <5.0
Cadmium	N.D. - <0.0004%	N.D. - <0.02
Chromium, Total	2.70%	N.D. - <0.05
Copper	4.24%	0.23
Lead	N.D. - <0.001%	N.D. - <0.05
Mercury	N.A.	N.A.
Nickel	1.10%	1.45
Selenium	N.A.	N.A.
Silver	N.D. - <0.0004%	N.D. - <0.02
Zinc	3.78%	1.71
pH	9.30	
% Solids -	1.74%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

jzz

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample F Lagoon # 2

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. <0.1%	N.D. <5.0
Cadmium	N.D. <0.0004%	N.D. <0.02
Chromium, Total	1.86%	N.D. <0.05
Copper	5.04%	1.05
Lead	N.D. <0.001%	N.D. < 0.05
Mercury	N.A.	N.A.
Nickel	2.08	8.20
Selenium	N.A.	N.A.
Silver	N.D. <0.0004%	N.D. < 0.02
Zinc	6.14	17.6
pH	8.92	
% Solids -	4.15%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample G Lagoon # 2

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. <0.10%	N.D. <5.0
Cadmium	N.D. <0.0004%	N.D. <0.02
Chromium, Total	2.18%	N.D. <0.05
Copper	3.00%	0.20
Lead	N.D. <0.001%	N.D. <0.05
Mercury	N.A.	N.A.
Nickel	1.10%	0.63
Selenium	N.A.	N.A.
Silver	N.D. <0.0004%	N.D. <0.02
Zinc	4.00%	3.25
pH	8.53	
% Solids -	3.02%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample H Lagoon # 2

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D.<0.10%	N.D. <5.0
Cadmium	N.D.<0.0004%	N.D. <0.02
Chromium, Total	2.44	N.D. <0.05
Copper	3.10	0.20
Lead	N.D.<0.001%	N.D. <0.05
Mercury	N.A.	N.A.
Nickel	1.36%	4.87
Selenium	N.A.	N.A.
Silver	N.D.<0.0004%	N.D. <0.02
Zinc	5.16%	14.5
pH	8.85	
% Solids -	2.73%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample I Lagoon # 3

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. <0.10%	N.D. <5.0
Cadmium	N.D. <0.0004%	N.D. <0.02
Chromium, Total	1.28%	0.32
Copper	1.64%	0.32
Lead	N.D. <0.001%	N.D. <0.05
Mercury	N.A.	N.A.
Nickel	1.88%	6.25
Selenium	N.A.	N.A.
Silver	N.D. <0.0004%	N.D. <0.02
Zinc	1.70%	0.70
pH	9.13	
% Solids -	1.74%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample J Lagoon # 3

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. <0.10%	N.D. <5.0
Cadmium	N.D. <0.0004%	N.D. <0.02
Chromium, Total	1.34%	N.D. <0.05
Copper	2.76%	0.38
Lead	N.D. <0.001%	N.D. <0.05
Mercury	N.A.	N.A.
Nickel	2.60%	9.50
Selenium	N.A.	N.A.
Silver	N.D. <0.0004%	N.D. <0.02
Zinc	2.68%	5.50
pH	9.09	
% Solids -	2.01%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample K Lagoon # 4

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. < 0.10%	N.D. < 0.50
Cadmium	N.D. < 0.0004%	N.D. < 0.02
Chromium, Total	0.96%	N.D. < 0.05
Copper	0.80%	0.40
Lead	N.D. < 0.001%	N.D. < 0.05
Mercury	N.A.	N.A.
Nickel	1.40%	1.95
Selenium	N.A.	N.A.
Silver	N.D. < 0.0004%	N.D. < 0.02
Zinc	1.32%	0.94
pH	9.53	
% Solids -	1.13%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample L Lagoon # 4

Parameter	Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic	N.A.	N.A.
Barium	N.D. <0.10%	N.D. <5.0
Cadmium	N.D. <0.0004%	N.D. <0.02
Chromium, Total	1.06%	N.D. <0.05
Copper	2.00%	0.20
Lead	N.D. 0.001%	N.D. <0.05
Mercury	N.A.	N.A.
Nickel	1.68%	6.20
Selenium	N.A.	N.A.
Silver	N.D. <0.0004%	N.D. <0.02
Zinc	2.00%	2.20
pH	9.03	
% Solids -	1.25%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

dlw

Analysis Data

Stanley Tools - Fowlerville
E.P.A. I.D. #MID099124299

Sample M #1299 Lagoon #1,2,3,4 Composite

Parameter		Total Metals % Dry Weight	Extractable Metals mg/l
Arsenic *	N.D.	<0.000272%	N.A.
Barium	N.D.	<0.01%	N.D. <5.0
Cadmium	N.D.	<0.0004%	N.D. <0.02
Chromium, Total		2.14%	N.D. <0.05
Copper		3.36%	0.37
Lead	N.D.	<0.001%	N.D. <0.05
Mercury *	N.D.	<0.000589%	0.0027
Nickel		1.64%	0.95
Selenium *	N.D.	<0.000544%	N.A.
Silver	N.D.	<0.0004%	N.D. <0.02
Zinc		4.00%	2.65
pH		9.02	
% Solids -		3.16%	

N.A. - Not analyzed for in the individual samples since they are not used in our process. See Total Constituent Analysis Sample M.

N.D. - Not detected, concentration found to be lower than the detection limit given.

* Analyzed by TRC Environmental Consultants

dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample A — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.047	.046
20 mls 0.5 mg/l Cu and 30 mls Sample	.060	.060
20 mls 1.0 mg/l Cu and 30 mls Sample	.076	.075
20 mls 2.0 mg/l Cu and 30 mls Sample	.104	.104

X - Intercept = 1.93

Sample Concentration x Dilution Factor = Actual Concentration

1.93 mg/l x 100 = 193.0 mg/l Cu

% By Weight (dry weight basis) - 3.86

William J. Guerrera
Stanley Laboratory

dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample A — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.173	.171
20 mls 0.5 mg/l Zn and 30 mls Sample	.227	.226
20 mls 1.0 mg/l Zn and 30 mls Sample	.286	.285
20 mls 2.0 mg/l Zn and 30 mls Sample	.394	.395

X - Intercept = 1.40

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.40 mg/l		100		140.0 mg/l Zn

% By Weight (dry weight basis) - 2.80

William J. Guerrera
Stanley Laboratory

dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample A — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.020	.020
20 mls 0.5 mg/l Ni and 30 mls Sample	.027	.027
20 mls 1.0 mg/l Ni and 30 mls Sample	.035	.034
20 mls 2.0 mg/l Ni and 30 mls Sample	.047	.049

X - Intercept = 1.37

Sample Concentration x Dilution Factor = Actual Concentration

1.37 mg/l — 100 — 137.0 mg/l Ni

% By Weight (dry weight basis) - 2.74

William J. Guerrera
Stanley Laboratory

dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample A — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.032	.032
20 mls 0.5 mg/l Cr and 30 mls Sample	.045	.045
20 mls 1.0 mg/l Cr and 30 mls Sample	.059	.059
20 mls 2.0 mg/l Cr and 30 mls Sample	.086	.085

X - Intercept = 1.20

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.20 mg/l		100	120.0mg/l Cr

% By Weight (dry weight basis) - 2.40

William J. Guerrera
Stanley Laboratory

dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample B — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.047	.047
20 mls 0.5 mg/l Cu and 30 mls Sample	.061	.061
20 mls 1.0 mg/l Cu and 30 mls Sample	.075	.075
20 mls 2.0 mg/l Cu and 30 mls Sample	.105	.103

X - Intercept = 1.62

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.62 mg/l		100		162.0 mg/l Cu

% By Weight (dry weight basis) - 3.24

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample B — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.226	.225
20 mls 0.5 mg/l Zn and 30 mls Sample	.282	.282
20 mls 1.0 mg/l Zn and 30 mls Sample	.339	.338
20 mls 2.0 mg/l Zn and 30 mls Sample	.450	.450

X - Intercept = 2.00

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.00 mg/l		100	200.0 mg/l Zn

% By Weight (dry weight basis) - 4.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample B — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.013	.013
20 mls 0.5 mg/l Ni and 30 mls Sample	.020	.020
20 mls 1.0 mg/l Ni and 30 mls Sample	.027	.027
20 mls 2.0 mg/l Ni and 30 mls Sample	.041	.041

X - Intercept = .90

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.90 mg/l		100	90.0 mg/l Ni

% By Weight (dry weight basis) - 1.80

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample B — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.023	.023
20 mls 0.5 mg/l Cr and 30 mls Sample	.036	.036
20 mls 1.0 mg/l Cr and 30 mls Sample	.049	.049
20 mls 2.0 mg/l Cr and 30 mls Sample	.074	.074

X - Intercept = .850

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.85 mg/l		100	85.0 mg/l Cr

% By Weight (dry weight basis) - 1.70

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample C — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.031	.031
20 mls 0.5 mg/l Cu and 30 mls Sample	.044	.044
20 mls 1.0 mg/l Cu and 30 mls Sample	.056	.056
20 mls 2.0 mg/l Cu and 30 mls Sample	.080	.080

X - Intercept = 1.27

Sample Concentration x Dilution Factor = Actual Concentration

1.27 mg/l x 100 = 127 mg/l Cu

% By Weight (dry weight basis) - 2.54

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Atomic Absorption Analysis — Stanley Tools - Powlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample C — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.195	.194
20 mls 0.5 mg/l Zn and 30 mls Sample	.245	.245
20 mls 1.0 mg/l Zn and 30 mls Sample	.298	.298
20 mls 2.0 mg/l Zn and 30 mls Sample	.390	.400

X - Intercept = 1.87

Sample Concentration x Dilution Factor = Actual Concentration

1.87 mg/l x 100 = 187 mg/l Zn

% By Weight (dry weight basis) - 3.74

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample C — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.017	.017
20 mls 0.5 mg/l Ni and 30 mls Sample	.026	.026
20 mls 1.0 mg/l Ni and 30 mls Sample	.035	.035
20 mls 2.0 mg/l Ni and 30 mls Sample	.051	.051

X - Intercept = .90

Sample Concentration	x	Dilution Factor =	Actual Concentration
.90 mg/l		100	90 mg/l Ni

% By Weight (dry weight basis) - 1.80

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample C — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.056	.056
20 mls 0.5 mg/l Cr and 30 mls Sample	.066	.066
20 mls 1.0 mg/l Cr and 30 mls Sample	.076	.076
20 mls 2.0 mg/l Cr and 30 mls Sample	.096	.097

X - Intercept = 2.80

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.80 mg/l		100	280 mg/l Cr

% By Weight (dry weight basis) - 5.60

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample D — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.021	.021
20 mls 0.5 mg/l Cu and 30 mls Sample	.034	.034
20 mls 1.0 mg/l Cu and 30 mls Sample	.047	.047
20 mls 2.0 mg/l Cu and 30 mls Sample	.074	.076

X - Intercept = .76

Sample Concentration	x	Dilution Factor =	Actual Concentration
.76 mg/l		100	76 mg/l Cu

% By Weight (dry weight basis) - 1.52

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample D — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.017	.017
20 mls 0.5 mg/l Ni and 30 mls Sample	.024	.024
20 mls 1.0 mg/l Ni and 30 mls Sample	.032	.032
20 mls 2.0 mg/l Ni and 30 mls Sample	.047	.048

X - Intercept = 1.15

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.15 mg/l		100	115 mg/l Ni

% By Weight (dry weight basis) - 2.30

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample D — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.162	.159
20 mls 0.5 mg/l Zn and 30 mls Sample	.217	.216
20 mls 1.0 mg/l Zn and 30 mls Sample	.276	.274
20 mls 2.0 mg/l Zn and 30 mls Sample	.380	.381

X - Intercept = 1.40

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.40 mg/l		100	140 mg/l Zn

% By Weight (dry weight basis) - 2.80

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample D — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.057	.057
20 mls 0.5 mg/l Cr and 30 mls Sample	.066	.064
20 mls 1.0 mg/l Cr and 30 mls Sample	.077	.076
20 mls 2.0 mg/l Cr and 30 mls Sample	.098	.097

X - Intercept = 2.80

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.80 mg/l		100	280 mg/l Cr

% By Weight (dry weight basis) - 5.60

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample E — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.059	.058
20 mls 0.5 mg/l Cu and 30 mls Sample	.073	.072
20 mls 1.0 mg/l Cu and 30 mls Sample	.087	.086
20 mls 2.0 mg/l Cu and 30 mls Sample	.115	.114

X - Intercept = 2.12

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.12 mg/l		100	212 mg/l Cu

% By Weight (dry weight basis) - 4.24

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample E — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.011	.010
20 mls 0.5 mg/l Ni and 30 mls Sample	.020	.021
20 mls 1.0 mg/l Ni and 30 mls Sample	.029	.032
20 mls 2.0 mg/l Ni and 30 mls Sample	.047	.054

X - Intercept = .55

Sample Concentration	x	Dilution Factor	=	Actual Concentration
.55 mg/l		100		55 mg/l Ni

% By Weight (dry weight basis) - 1.10

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample E — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor: 100

Element Analyzed: Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.238	.239
20 mls 0.5 mg/l Zn and 30 mls Sample	.303	.298
20 mls 1.0 mg/l Zn and 30 mls Sample	.364	.363
20 mls 2.0 mg/l Zn and 30 mls Sample	.469	.463

X - Intercept = 1.89

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.89 mg/l		100	189 mg/l Zn

% By Weight (dry weight basis) - 3.78

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample E — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.034	.034
20 mls 0.5 mg/l Cr and 30 mls Sample	.046	.046
20 mls 1.0 mg/l Cr and 30 mls Sample	.061	.060
20 mls 2.0 mg/l Cr and 30 mls Sample	.085	.084

X - Intercept = 1.35

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.35 mg/l		100		135 mg/l Cr

% By Weight (dry weight basis) - 2.70

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample F — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor: 100

Element Analyzed: Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.074	.074
20 mls 0.5 mg/l Cu and 30 mls Sample	.088	.088
20 mls 1.0 mg/l Cu and 30 mls Sample	.102	.102
20 mls 2.0 mg/l Cu and 30 mls Sample	.130	.130

X - Intercept = 2.52

Sample Concentration x Dilution Factor = Actual Concentration

2.52 mg/l x 100 = 252 mg/l Cu

% By Weight (dry weight basis) - 5.04

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Atomic Absorption Analysis

Stanley Tools - Fowlerville

Total Metals Analysis

E.P.A. I.D. #MID099124299

Sample F

Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.345	.345
20 mls 0.5 mg/l Zn and 30 mls Sample	.400	.400
20 mls 1.0 mg/l Zn and 30 mls Sample	.456	.458
20 mls 2.0 mg/l Zn and 30 mls Sample	.556	.556

X - Intercept = 3.07

Sample Concentration	x	Dilution Factor =	Actual Concentration
3.07 mg/l		100	307.0 mg/l Zn

% By Weight (dry weight basis) - 6.14

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Atomic Absorption Analysis

Total Metals Analysis

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E.P.A. I.D. #MID099124299

Sample F

Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.013	.013
20 mls 0.5 mg/l Ni and 30 mls Sample	.019	.019
20 mls 1.0 mg/l Ni and 30 mls Sample	.025	.025
20 mls 2.0 mg/l Ni and 30 mls Sample	.037	.037

X - Intercept = 1.04

Sample Concentration	x	Dilution Factor	=	Actual Concentration	
1.04 mg/l		100		104.0 mg/l	Ni

% By Weight (dry weight basis) - 2.08

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample F — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.024	.024
20 mls 0.5 mg/l Cr and 30 mls Sample	.037	.037
20 mls 1.0 mg/l Cr and 30 mls Sample	.051	.051
20 mls 2.0 mg/l Cr and 30 mls Sample	.075	.075

X - Intercept = .93

Sample Concentration	x	Dilution Factor =	Actual Concentration
.93 mg/l		100	93 mg/l Cr

% By Weight (dry weight basis) - 1.86

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample G — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.039	.039
20 mls 0.5 mg/l Cu and 30 mls Sample	.053	.052
20 mls 1.0 mg/l Cu and 30 mls Sample	.065	.065
20 mls 2.0 mg/l Cu and 30 mls Sample	.092	.091

X - Intercept = 1.50

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.50 mg/l		100	150 mg/l Cu

% By Weight (dry weight basis) - 3.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample G — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.241	.238
20 mls 0.5 mg/l Zn and 30 mls Sample	.298	.299
20 mls 1.0 mg/l Zn and 30 mls Sample	.355	.352
20 mls 2.0 mg/l Zn and 30 mls Sample	.452	.451

X - Intercept = 2.00

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.00 mg/l		100	200 mg/l Zn

% By Weight (dry weight basis) - 4.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample G — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.010	.010
20 mls 0.5 mg/l Ni and 30 mls Sample	.019	.019
20 mls 1.0 mg/l Ni and 30 mls Sample	.028	.029
20 mls 2.0 mg/l Ni and 30 mls Sample	.046	.047

X - Intercept = .55

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.55 mg/l		100	55.0 mg/l Ni

% By Weight (dry weight basis) - 1.10

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample G — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium Total

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.024	.024
20 mls 0.5 mg/l Cr and 30 mls Sample	.034	.034
20 mls 1.0 mg/l Cr and 30 mls Sample	.047	.045
20 mls 2.0 mg/l Cr and 30 mls Sample	.068	.068

X - Intercept = 1.09

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.09 mg/l		100		109 mg/l Cr

% By Weight (dry weight basis) - 2.18

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample H — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.046	.046
20 mls 0.5 mg/l Cu and 30 mls Sample	.060	.060
20 mls 1.0 mg/l Cu and 30 mls Sample	.075	.075
20 mls 2.0 mg/l Cu and 30 mls Sample	.106	.106

X - Intercept = 1.55

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.55 mg/l		100	155.0 mg/l Cu

% By Weight (dry weight basis) - 3.10

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample H — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.279	.279
20 mls 0.5 mg/l Zn and 30 mls Sample	.333	.333
20 mls 1.0 mg/l Zn and 30 mls Sample	.387	.387
20 mls 2.0 mg/l Zn and 30 mls Sample	.485	.485

X - Intercept = 2.58

Sample Concentration	x	Dilution Factor	=	Actual Concentration
2.58 mg/l		100		258.0 mg/l Zn

% By Weight (dry weight basis) - 5.16

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample H — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.011	.011
20 mls 0.5 mg/l Ni and 30 mls Sample	.019	.019
20 mls 1.0 mg/l Ni and 30 mls Sample	.027	.027
20 mls 2.0 mg/l Ni and 30 mls Sample	.043	.043

X - Intercept = .68

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.68 mg/l		100		68.0 mg/l Ni

% By Weight (dry weight basis) - 1.36

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample H — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.024	.026
20 mls 0.5 mg/l Cr and 30 mls Sample	.035	.035
20 mls 1.0 mg/l Cr and 30 mls Sample	.045	.045
20 mls 2.0 mg/l Cr and 30 mls Sample	.068	.068

X - Intercept = 1.22

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.22 mg/l		100	122.0 mg/l Cr

% By Weight (dry weight basis) - 2.44

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample I — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.029	.029
20 mls 0.5 mg/l Cu and 30 mls Sample	.046	.046
20 mls 1.0 mg/l Cu and 30 mls Sample	.062	.062
20 mls 2.0 mg/l Cu and 30 mls Sample	.096	.098

X - Intercept = .820

Sample Concentration x Dilution Factor = Actual Concentration

0.82 mg/l — 100 — 82.0 mg/l Cu

% By Weight (dry weight basis) - 1.64

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample I — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.115	.116
20 mls 0.5 mg/l Zn and 30 mls Sample	.182	.182
20 mls 1.0 mg/l Zn and 30 mls Sample	.248	.251
20 mls 2.0 mg/l Zn and 30 mls Sample	.381	.380

X - Intercept = .85

Sample Concentration x Dilution Factor = Actual Concentration

0.85 mg/l — 100 — 85.0 mg/l Zn

% By Weight (dry weight basis) - 1.70

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample I — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.018	.017
20 mls 0.5 mg/l Ni and 30 mls Sample	.027	.022
20 mls 1.0 mg/l Ni and 30 mls Sample	.038	.035
20 mls 2.0 mg/l Ni and 30 mls Sample	.054	.052

X - Intercept = .940

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.94 mg/l		100	94.0 mg/l Ni

% By Weight (dry weight basis) - 1.88

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample I — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.018	.018
20 mls 0.5 mg/l Cr and 30 mls Sample	.033	.033
20 mls 1.0 mg/l Cr and 30 mls Sample	.047	.046
20 mls 2.0 mg/l Cr and 30 mls Sample	.076	.075

X - Intercept = .640

Sample Concentration x Dilution Factor = Actual Concentration

0.64 mg/l — 100 — 64.0 mg/l Cr

% By Weight (dry weight basis) - 1.28

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample J — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.049	.050
20 mls 0.5 mg/l Cu and 30 mls Sample	.066	.066
20 mls 1.0 mg/l Cu and 30 mls Sample	.082	.083
20 mls 2.0 mg/l Cu and 30 mls Sample	.118	.119

X - Intercept = 1.38

Sample Concentration	x	Dilution Factor =	Actual Concentration
1.38 mg/l		100	138.0 mg/l Cu

% By Weight (dry weight basis) - 2.76

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample J — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.170	.170
20 mls 0.5 mg/l Zn and 30 mls Sample	.235	.235
20 mls 1.0 mg/l Zn and 30 mls Sample	.299	.299
20 mls 2.0 mg/l Zn and 30 mls Sample	.420	.420

X - Intercept = 1.34

Sample Concentration x Dilution Factor = Actual Concentration

1.34 mg/l x 100 = 134 mg/l Zn

% By Weight (dry weight basis) - 2.68

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample J — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.026	.026
20 mls 0.5 mg/l Ni and 30 mls Sample	.036	.035
20 mls 1.0 mg/l Ni and 30 mls Sample	.046	.044
20 mls 2.0 mg/l Ni and 30 mls Sample	.075	.076

X - Intercept = 1.30

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.30 mg/l		100		130.0 mg/l Ni

% By Weight (dry weight basis) - 2.60

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample J — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.015	.015
20 mls 0.5 mg/l Cr and 30 mls Sample	.029	.029
20 mls 1.0 mg/l Cr and 30 mls Sample	.044	.043
20 mls 2.0 mg/l Cr and 30 mls Sample	.075	.076

X - Intercept = .670

Sample Concentration x Dilution Factor = Actual Concentration

0.67 mg/l 100 67.0 mg/l Cr

% By Weight (dry weight basis) - 1.34

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample K — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.011	.010
20 mls 0.5 mg/l Cu and 30 mls Sample	.025	.026
20 mls 1.0 mg/l Cu and 30 mls Sample	.039	.040
20 mls 2.0 mg/l Cu and 30 mls Sample	.069	.070

X - Intercept = .400

Sample Concentration x Dilution Factor = Actual Concentration

0.40 mg/l — 100 — 40.0 mg/l Cu

% By Weight (dry weight basis) - 0.80

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample K — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.160	.160
20 mls 0.5 mg/l Zn and 30 mls Sample	.285	.285
20 mls 1.0 mg/l Zn and 30 mls Sample	.410	.411
20 mls 2.0 mg/l Zn and 30 mls Sample	.645	- .646

X - Intercept = .660

Sample Concentration x Dilution Factor = Actual Concentration

0.66 mg/l — 100 — 66.0 mg/l Zn

% By Weight (dry weight basis) - 1.32

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample K — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.013	.013
20 mls 0.5 mg/l Ni and 30 mls Sample	.022	.021
20 mls 1.0 mg/l Ni and 30 mls Sample	.031	.032
20 mls 2.0 mg/l Ni and 30 mls Sample	.049	.049

X - Intercept = .200

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.200 mg/l		100	20.0 mg/l Ni

% By Weight (dry weight basis) - 1.40

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample K — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.011	.011
20 mls 0.5 mg/l Cr and 30 mls Sample	.019	.019
20 mls 1.0 mg/l Cr and 30 mls Sample	.028	.029
20 mls 2.0 mg/l Cr and 30 mls Sample	.046	.047

X - Intercept = .480

Sample Concentration x Dilution Factor = Actual Concentration

0.48 mg/l 100 48.0 mg/l Cr

% By Weight (dry weight basis) - 0.96

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample L — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.031	.030
20 mls 0.5 mg/l Cu and 30 mls Sample	.046	.046
20 mls 1.0 mg/l Cu and 30 mls Sample	.061	.061
20 mls 2.0 mg/l Cu and 30 mls Sample	.091	.091

X - Intercept = 1.00

Sample Concentration x Dilution Factor = Actual Concentration

1.00 mg/l x 100 = 100.0 mg/l Cu

% By Weight (dry weight basis) - 2.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample L — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.130	.130
20 mls 0.5 mg/l Zn and 30 mls Sample	.198	.197
20 mls 1.0 mg/l Zn and 30 mls Sample	.264	.260
20 mls 2.0 mg/l Zn and 30 mls Sample	.370	.368

X - Intercept = 1.00

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.00 mg/l		100		100.0 mg/l Zn

% By Weight (dry weight basis) - 2.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample L — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.017	.018
20 mls 0.5 mg/l Ni and 30 mls Sample	.027	.027
20 mls 1.0 mg/l Ni and 30 mls Sample	.037	.037
20 mls 2.0 mg/l Ni and 30 mls Sample	.055	.056

X - Intercept = .840

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.84 mg/l		100		84.0 mg/l Ni

% By Weight (dry weight basis) - 1.68

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample L — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.016	.018
20 mls 0.5 mg/l Cr and 30 mls Sample	.034	.034
20 mls 1.0 mg/l Cr and 30 mls Sample	.050	.050
20 mls 2.0 mg/l Cr and 30 mls Sample	.082	.083

X - Intercept = .530

Sample Concentration x Dilution Factor = Actual Concentration

0.53 mg/l x 100 = 53.0 mg/l Cr

% By Weight (dry weight basis) - 1.06

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample M — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Copper (Cu)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.043	.043
20 mls 0.5 mg/l Cu and 30 mls Sample	.057	.056
20 mls 1.0 mg/l Cu and 30 mls Sample	.072	.071
20 mls 2.0 mg/l Cu and 30 mls Sample	.101	.100

X - Intercept = 1.68

Sample Concentration	x	Dilution Factor =	Actual Concentration
0.168 mg/l		100	168.0 mg/l Cu

% By Weight (dry weight basis) - 3.36

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample M — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.195	.195
20 mls 0.5 mg/l Zn and 30 mls Sample	.252	.252
20 mls 1.0 mg/l Zn and 30 mls Sample	.311	.309
20 mls 2.0 mg/l Zn and 30 mls Sample	.410	.409

X - Intercept = 2.00

Sample Concentration	x	Dilution Factor =	Actual Concentration
2.00 mg/l		100	200.0 mg/l Zn

% By Weight (dry weight basis) - 4.00

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample M — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.015	.016
20 mls 0.5 mg/l Ni and 30 mls Sample	.025	.025
20 mls 1.0 mg/l Ni and 30 mls Sample	.033	.034
20 mls 2.0 mg/l Ni and 30 mls Sample	.049	.053

X - Intercept = .82

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.82 mg/l		100		82.0 mg/l Ni

% By Weight (dry weight basis) - 1.64

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Total Metals Analysis — E.P.A. I.D. #MID099124299

Sample M — Sample Size 1.0000 gm

Acid digested and analyzed by the Method of Standard Additions performed in duplicate.

Dilution Factor 100

Element Analyzed Chromium (Cr)

Standard Additions	Absorbance	
20 mls Blank and 30 mls Sample	.033	.033
20 mls 0.5 mg/l Cr and 30 mls Sample	.050	.050
20 mls 1.0 mg/l Cr and 30 mls Sample	.065	.065
20 mls 2.0 mg/l Cr and 30 mls Sample	.092	.092

X - Intercept = 1.07

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.07 mg/l		100		107.0 mg/l Cr

% By Weight (dry weight basis) - 2.14

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor: None

Element Analyzed: Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.008	.008	.008
20 mls 0.5 mg/l Cu and 30 mls Sample	.019	.019	.019
20 mls 1.0 mg/l Cu and 30 mls Sample	.029	.029	.029
20 mls 2.0 mg/l Cu and 30 mls Sample	.050	.050	.050

X - Intercept = .38

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.38 mg/l		-		0.38 mg/l Cu

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.019	.019	.019
20 mls 0.5 mg/l Ni and 30 mls Sample	.025	.025	.025
20 mls 1.0 mg/l Ni and 30 mls Sample	.031	.031	.031
20 mls 2.0 mg/l Ni and 30 mls Sample	.043	.043	.043

X - Intercept = 1.60

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.60 mg/l		-		1.60 mg/l Ni

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.077	.078	.079
20 mls 0.5 mg/l Zn and 30 mls Sample	.120	.120	.120
20 mls 1.0 mg/l Zn and 30 mls Sample	.166	.166	.166
20 mls 2.0 mg/l Zn and 30 mls Sample	.250	.250	.250

X - Intercept = .85

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.85 mg/l		-		0.85 mg/l Zn

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.005	.005	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.010	.010	.010
20 mls 2.0 mg/l Pb and 30 mls Sample	.020	.020	.020

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.006	.006	.006
20 mls 1.0 mg/l Cr and 30 mls Sample	.011	.011	.011
20 mls 2.0 mg/l Cr and 30 mls Sample	.021	.021	.021

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis

Stanley Tools - Fowlerville

E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample A

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.033	.033	.033
20 mls 1.0 mg/l Cd and 30 mls Sample	.060	.060	.060
20 mls 2.0 mg/l Cd and 30 mls Sample	.120	.120	.120

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		$\leq$ 0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis

Stanley Tools - Fowlerville

E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.015	.015	.015
20 mls 0.5 mg/l Cu and 30 mls Sample	.025	.025	.025
20 mls 1.0 mg/l Cu and 30 mls Sample	.037	.037	.037
20 mls 2.0 mg/l Cu and 30 mls Sample	.058	.058	.058

X - Intercept = .70

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.70 mg/l		-		0.70 mg/l Cu

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.057	.057	.057
20 mls 0.5 mg/l Ni and 30 mls Sample	.063	.063	.063
20 mls 1.0 mg/l Ni and 30 mls Sample	.069	.069	.069
20 mls 2.0 mg/l Ni and 30 mls Sample	.082	.082	.082

X - Intercept = 4.5

Sample Concentration	x	Dilution Factor	=	Actual Concentration
4.50 mg/l		-		4.50 mg/l Ni

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.080	.082	.085
20 mls 0.5 mg/l Zn and 30 mls Sample	.121	.121	.125
20 mls 1.0 mg/l Zn and 30 mls Sample	.160	.160	.163
20 mls 2.0 mg/l Zn and 30 mls Sample	.230	.233	.236

X - Intercept = .105

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.105 mg/l		10		10.5 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.006	.005	.005
20 mls 1.0 mg/l Cr and 30 mls Sample	.011	.010	.011
20 mls 2.0 mg/l Cr and 30 mls Sample	.021	.020	.021

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		< 0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis

Stanley Tools - Fowlerville

E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.004	.005	.004
20 mls 1.0 mg/l Pb and 30 mls Sample	.010	.009	.009
20 mls 2.0 mg/l Pb and 30 mls Sample	.018	.019	.019

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		$<$0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample B

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.031	.032	.030
20 mls 1.0 mg/l Cd and 30 mls Sample	.063	.062	.063
20 mls 2.0 mg/l Cd and 30 mls Sample	.121	.120	.121

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.011	.011	.011
20 mls 0.5 mg/l Cu and 30 mls Sample	.022	.022	.022
20 mls 1.0 mg/l Cu and 30 mls Sample	.033	.033	.033
20 mls 2.0 mg/l Cu and 30 mls Sample	.053	.054	.054

X - Intercept = .50

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.50 mg/l		-		0.50 mg/l Cu

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.038	.038	.038
20 mls 0.5 mg/l Ni and 30 mls Sample	.045	.046	.045
20 mls 1.0 mg/l Ni and 30 mls Sample	.052	.052	.052
20 mls 2.0 mg/l Ni and 30 mls Sample	.065	.065	.065

X - Intercept = 2.70

Sample Concentration	x	Dilution Factor	=	Actual Concentration
2.70 mg/l		-		2.70 mg/l Ni

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.427	.423	.424
20 mls 0.5 mg/l Zn and 30 mls Sample	.455	.452	.452
20 mls 1.0 mg/l Zn and 30 mls Sample	.485	.485	.485
20 mls 2.0 mg/l Zn and 30 mls Sample	.545	.546	.547

X - Intercept = 7.10

Sample Concentration	x	Dilution Factor	=	Actual Concentration
7.10 mg/l		-		7.10 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.007	.007	.007
20 mls 1.0 mg/l Cr and 30 mls Sample	.014	.014	.014
20 mls 2.0 mg/l Cr and 30 mls Sample	.028	.028	.028

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.005	.005	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.009	.009	.009
20 mls 2.0 mg/l Pb and 30 mls Sample	.018	.018	.018

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample C

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.032	.032	.032
20 mls 1.0 mg/l Cd and 30 mls Sample	.064	.064	.064
20 mls 2.0 mg/l Cd and 30 mls Sample	.123	.123	.123

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.008	.007	.008
20 mls 0.5 mg/l Cu and 30 mls Sample	.018	.018	.018
20 mls 1.0 mg/l Cu and 30 mls Sample	.028	.028	.028
20 mls 2.0 mg/l Cu and 30 mls Sample	.049	.048	.048

X - Intercept = .38

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.38 mg/l		-		0.38 mg/l Cu

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E.P. Toxicity Extraction

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Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.016	.016	.016
20 mls 0.5 mg/l Ni and 30 mls Sample	.022	.022	.022
20 mls 1.0 mg/l Ni and 30 mls Sample	.028	.028	.028
20 mls 2.0 mg/l Ni and 30 mls Sample	.040	.040	.040

X - Intercept = 1.33

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.33 mg/l		-		1.33 mg/l Ni

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E.P. Toxicity Extraction

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Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.045	.095	.095
20 mls 0.5 mg/l Zn and 30 mls Sample	.139	.138	.138
20 mls 1.0 mg/l Zn and 30 mls Sample	.182	.182	.183
20 mls 2.0 mg/l Zn and 30 mls Sample	.271	.269	.269

X - Intercept = 1.05

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.05 mg/l		—		1.05 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.007	.007	.007
20 mls 1.0 mg/l Cr and 30 mls Sample	.014	.014	.014
20 mls 2.0 mg/l Cr and 30 mls Sample	.028	.028	.028

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.006	.006	.006
20 mls 1.0 mg/l Pb and 30 mls Sample	.012	.012	.012
20 mls 2.0 mg/l Pb and 30 mls Sample	.017	.017	.017

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		< 0.05 mg/l Pb

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample D

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.031	.032	.031
20 mls 1.0 mg/l Cd and 30 mls Sample	.064	.063	.063
20 mls 2.0 mg/l Cd and 30 mls Sample	.117	.117	.117

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		—		$\leq$ 0.02 mg/l Cd

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.005	.005	.005
20 mls 0.5 mg/l Cu and 30 mls Sample	.015	.015	.015
20 mls 1.0 mg/l Cu and 30 mls Sample	.025	.025	.025
20 mls 2.0 mg/l Cu and 30 mls Sample	.047	.049	.046

X - Intercept = .23

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.23 mg/l		-		0.23 mg/l Cu

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.019	.019	.019
20 mls 0.5 mg/l Ni and 30 mls Sample	.025	.025	.025
20 mls 1.0 mg/l Ni and 30 mls Sample	.032	.031	.031
20 mls 2.0 mg/l Ni and 30 mls Sample	.045	.044	.045

X - Intercept = 1.45

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.45 mg/l		-		1.45 mg/l Ni

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.160	.163	.165
20 mls 0.5 mg/l Zn and 30 mls Sample	.211	.213	.212
20 mls 1.0 mg/l Zn and 30 mls Sample	.258	.257	.260
20 mls 2.0 mg/l Zn and 30 mls Sample	.350	.346	.351

X - Intercept = 1.71

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.71 mg/l		-		1.71 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium , Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.007	.007	.007
20 mls 1.0 mg/l Cr and 30 mls Sample	.014	.014	.014
20 mls 2.0 mg/l Cr and 30 mls Sample	.028	.028	.028

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		=		<0.05 mg/l Cr

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.004	.005	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.009	.009	.008
20 mls 2.0 mg/l Pb and 30 mls Sample	.018	.018	.018

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		=		<0.05 mg/l Pb

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample E

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor NONE

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.037	.037	.037
20 mls 1.0 mg/l Cd and 30 mls Sample	.072	.072	.072
20 mls 2.0 mg/l Cd and 30 mls Sample	.134	.134	.134

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not Detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.024	.024	.024
20 mls 0.5 mg/l Cu and 30 mls Sample	.035	.035	.035
20 mls 1.0 mg/l Cu and 30 mls Sample	.048	.046	.046
20 mls 2.0 mg/l Cu and 30 mls Sample	.067	.068	.068

X - Intercept = 1.05

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.05 mg/l		-		1.05 mg/l Cu

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.125	.125	.125
20 mls 0.5 mg/l Ni and 30 mls Sample	.133	.132	.134
20 mls 1.0 mg/l Ni and 30 mls Sample	.140	.140	.140
20 mls 2.0 mg/l Ni and 30 mls Sample	.155	.155	.156

X - Intercept = 8.20

Sample Concentration	x	Dilution Factor	=	Actual Concentration
8.20 mg/l		-		8.20 mg/l Ni

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.172	.174	.173
20 mls 0.5 mg/l Zn and 30 mls Sample	.222	.221	.223
20 mls 1.0 mg/l Zn and 30 mls Sample	.268	.270	.270
20 mls 2.0 mg/l Zn and 30 mls Sample	.356	.357	.356

X - Intercept = 1.76

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.76 mg/l		10		17.6 mg/l Zn

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Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.009	.008	.009
20 mls 1.0 mg/l Cr and 30 mls Sample	.016	.015	.017
20 mls 2.0 mg/l Cr and 30 mls Sample	.031	.030	.031

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor -

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.006	.006	.006
20 mls 1.0 mg/l Pb and 30 mls Sample	.011	.012	.011
20 mls 2.0 mg/l Pb and 30 mls Sample	.022	.022	.022

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample F

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.001	.00
20 mls 0.5 mg/l Cd and 30 mls Sample	.030	.031	.032
20 mls 1.0 mg/l Cd and 30 mls Sample	.060	.060	.062
20 mls 2.0 mg/l Cd and 30 mls Sample	.112	.113	.114

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

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Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.004	.004	.005
20 mls 0.5 mg/l Cu and 30 mls Sample	.014	.015	.015
20 mls 1.0 mg/l Cu and 30 mls Sample	.026	.027	.027
20 mls 2.0 mg/l Cu and 30 mls Sample	.049	.049	.050

X - Intercept = .200

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.20 mg/l		-		0.20 mg/l Cu

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E.P. Toxicity Extraction

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Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.011	.012	.012
20 mls 0.5 mg/l Ni and 30 mls Sample	.021	.022	.022
20 mls 1.0 mg/l Ni and 30 mls Sample	.031	.032	.031
20 mls 2.0 mg/l Ni and 30 mls Sample	.049	.049	.049

X - Intercept = .630

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.63 mg/l		-		0.63 mg/l Ni

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Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.312	.313	.312
20 mls 0.5 mg/l Zn and 30 mls Sample	.360	.360	.360
20 mls 1.0 mg/l Zn and 30 mls Sample	.407	.408	.410
20 mls 2.0 mg/l Zn and 30 mls Sample	.480	.479	.480

X - Intercept = 3.25

Sample Concentration	x	Dilution Factor	=	Actual Concentration
3.25 mg/l		-		3.25 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.008	.009	.008
20 mls 1.0 mg/l Cr and 30 mls Sample	.016	.017	.016
20 mls 2.0 mg/l Cr and 30 mls Sample	.032	.032	.032

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.004	.005	.004
20 mls 1.0 mg/l Pb and 30 mls Sample	.009	.009	.009
20 mls 2.0 mg/l Pb and 30 mls Sample	.018	.018	.018

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		< 0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample G

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.035	.034	.036
20 mls 1.0 mg/l Cd and 30 mls Sample	.070	.070	.071
20 mls 2.0 mg/l Cd and 30 mls Sample	.134	.133	.135

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction

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Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.005	.005	.005
20 mls 0.5 mg/l Cu and 30 mls Sample	.017	.016	.017
20 mls 1.0 mg/l Cu and 30 mls Sample	.029	.028	.028
20 mls 2.0 mg/l Cu and 30 mls Sample	.052	.051	.052

X - Intercept = .200

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.20 mg/l		-		0.20 mg/l Cu

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Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.069	.068	.069
20 mls 0.5 mg/l Ni and 30 mls Sample	.076	.075	.075
20 mls 1.0 mg/l Ni and 30 mls Sample	.084	.083	.084
20 mls 2.0 mg/l Ni and 30 mls Sample	.097	.096	.096

X - Intercept = 4.87

Sample Concentration	x	Dilution Factor	=	Actual Concentration
4.87 mg/l		-		4.87 mg/l Ni

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.141	.142	.138
20 mls 0.5 mg/l Zn and 30 mls Sample	.190	.191	.190
20 mls 1.0 mg/l Zn and 30 mls Sample	.240	.235	.233
20 mls 2.0 mg/l Zn and 30 mls Sample	.328	.322	.324

X - Intercept = 1.45

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.45 mg/l		10		14.5 mg/l Zn

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Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.007	.007	.006
20 mls 1.0 mg/l Cr and 30 mls Sample	.014	.015	.013
20 mls 2.0 mg/l Cr and 30 mls Sample	.028	.028	.028

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.005	.006	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.010	.010	.010
20 mls 2.0 mg/l Pb and 30 mls Sample	.021	.020	.020

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		≤0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis

Stanley Tools - Fowlerville

E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample H

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.039	.039	.039
20 mls 1.0 mg/l Cd and 30 mls Sample	.078	.077	.078
20 mls 2.0 mg/l Cd and 30 mls Sample	.153	.154	.153

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.008	.008	.008
20 mls 0.5 mg/l Cu and 30 mls Sample	.020	.020	.020
20 mls 1.0 mg/l Cu and 30 mls Sample	.032	.032	.032
20 mls 2.0 mg/l Cu and 30 mls Sample	.057	.058	.056

X - Intercept = .32

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.32 mg/l		-		0.32 mg/l Cu

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.064	.064	.064
20 mls 0.5 mg/l Ni and 30 mls Sample	.070	.069	.070
20 mls 1.0 mg/l Ni and 30 mls Sample	.075	.073	.074
20 mls 2.0 mg/l Ni and 30 mls Sample	.082	.082	.082

X - Intercept = 6.25

Sample Concentration	x	Dilution Factor	=	Actual Concentration
6.25 mg/l		-		6.25 mg/l Ni

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.063	.064	.064
20 mls 0.5 mg/l Zn and 30 mls Sample	.108	.108	.108
20 mls 1.0 mg/l Zn and 30 mls Sample	.154	.154	.154
20 mls 2.0 mg/l Zn and 30 mls Sample	.239	.239	.240

X - Intercept = .70

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.70 mg/l		-		0.70 mg/l Zn

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.003	.002	.002
20 mls 0.5 mg/l Cr and 30 mls Sample	.010	.009	.010
20 mls 1.0 mg/l Cr and 30 mls Sample	.017	.018	.017
20 mls 2.0 mg/l Cr and 30 mls Sample	.031	.030	.030

X - Intercept = .32

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.32 mg/l		-		0.32 mg/l Cr

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.005	.004	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.011	.009	.010
20 mls 2.0 mg/l Pb and 30 mls Sample	.020	.020	.019

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample I

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.033	.033	.035
20 mls 1.0 mg/l Cd and 30 mls Sample	.065	.066	.069
20 mls 2.0 mg/l Cd and 30 mls Sample	.125	.125	.177

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.009	.009	.009
20 mls 0.5 mg/l Cu and 30 mls Sample	.021	.021	.021
20 mls 1.0 mg/l Cu and 30 mls Sample	.034	.033	.033
20 mls 2.0 mg/l Cu and 30 mls Sample	.057	.057	.057

X - Intercept = .38

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.38 mg/l		-		0.38 mg/l Cu

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.014	.014	.014
20 mls 0.5 mg/l Ni and 30 mls Sample	.022	.022	.022
20 mls 1.0 mg/l Ni and 30 mls Sample	.029	.029	.029
20 mls 2.0 mg/l Ni and 30 mls Sample	.044	.045	.044

X - Intercept = .95

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.95 mg/l		10		9.50 mg/l Ni

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.056	.056	.056
20 mls 0.5 mg/l Zn and 30 mls Sample	.101	.101	.101
20 mls 1.0 mg/l Zn and 30 mls Sample	.153	.155	.153
20 mls 2.0 mg/l Zn and 30 mls Sample	.253	.252	.252

X - Intercept = .55

Sample Concentration x Dilution Factor = Actual Concentration

0.55 mg/l 10 5.50 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor none

Element Analyzed Chromium Total, (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.011	.011	.010
20 mls 1.0 mg/l Cr and 30 mls Sample	.018	.018	.018
20 mls 2.0 mg/l Cr and 30 mls Sample	.032	.031	.032

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be less than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor none

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.005	.006	.005
20 mls 1.0 mg/l Pb and 30 mls Sample	.011	.010	.011
20 mls 2.0 mg/l Pb and 30 mls Sample	.021	.020	.020

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be less than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample J

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor none

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.031	.029	.030
20 mls 1.0 mg/l Cd and 30 mls Sample	.060	.060	.060
20 mls 2.0 mg/l Cd and 30 mls Sample	.107	.108	.106

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be less than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.006	.005	.005
20 mls 0.5 mg/l Cu and 30 mls Sample	.017	.017	.017
20 mls 1.0 mg/l Cu and 30 mls Sample	.030	.030	.030
20 mls 2.0 mg/l Cu and 30 mls Sample	.055	.055	.055

X - Intercept = .400

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.40 mg/l		-		0.40 mg/l Cu

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.030	.030	.030
20 mls 0.5 mg/l Ni and 30 mls Sample	.037	.038	.038
20 mls 1.0 mg/l Ni and 30 mls Sample	.045	.044	.045
20 mls 2.0 mg/l Ni and 30 mls Sample	.059	.059	.059

X - Intercept = 1.95

Sample Concentration	x	Dilution Factor	=	Actual Concentration
1.95 mg/l		-		1.95 mg/l Ni

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.093	.093	.093
20 mls 0.5 mg/l Zn and 30 mls Sample	.100	.102	.100
20 mls 1.0 mg/l Zn and 30 mls Sample	.200	.200	.199
20 mls 2.0 mg/l Zn and 30 mls Sample	.397	.398	.398

X - Intercept = .940

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.94 mg/l		-		0.94 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.010	.010	.010
20 mls 1.0 mg/l Cr and 30 mls Sample	.029	.020	.039
20 mls 2.0 mg/l Cr and 30 mls Sample	.040	.039	.039

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		< 0.05 mg/l Cr

N.D. - Not given, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.004	.005	.004
20 mls 1.0 mg/l Pb and 30 mls Sample	.010	.011	.011
20 mls 2.0 mg/l Pb and 30 mls Sample	.021	.020	.021

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not given, sample concentration was found to be lower than the detection limit given.

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Atomic Absorption Analysis

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E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample K

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.038	.036	.037
20 mls 1.0 mg/l Cd and 30 mls Sample	.077	.079	.077
20 mls 2.0 mg/l Cd and 30 mls Sample	.140	.151	.153

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.005	.005	.005
20 mls 0.5 mg/l Cu and 30 mls Sample	.018	.018	.018
20 mls 1.0 mg/l Cu and 30 mls Sample	.031	.030	.030
20 mls 2.0 mg/l Cu and 30 mls Sample	.054	.055	.059

X - Intercept = .200

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.20 mg/l		100		0.20 mg/l Cu

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor 10

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.011	.010	.011
20 mls 0.5 mg/l Ni and 30 mls Sample	.026	.026	.028
20 mls 1.0 mg/l Ni and 30 mls Sample	.044	.043	.043
20 mls 2.0 mg/l Ni and 30 mls Sample	.075	.077	.074

X - Intercept = .620

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.62 mg/l		10		6.20 mg/l Ni

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Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.214	.213	.213
20 mls 0.5 mg/l Zn and 30 mls Sample	.260	.262	.257
20 mls 1.0 mg/l Zn and 30 mls Sample	.305	.306	.308
20 mls 2.0 mg/l Zn and 30 mls Sample	.405	.407	.405

X - Intercept = 2.20

Sample Concentration	x	Dilution Factor	=	Actual Concentration
2.20 mg/l		-		2.20 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.012	.011	.012
20 mls 1.0 mg/l Cr and 30 mls Sample	.023	.024	.023
20 mls 2.0 mg/l Cr and 30 mls Sample	.047	.048	.047

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Cr

N.D. - Not given, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.006	.006	.007
20 mls 1.0 mg/l Pb and 30 mls Sample	.013	.012	.014
20 mls 2.0 mg/l Pb and 30 mls Sample	.025	.025	.025

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample L

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.043	.042	.043
20 mls 1.0 mg/l Cd and 30 mls Sample	.082	.083	.084
20 mls 2.0 mg/l Cd and 30 mls Sample	.165	.166	.165

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		≤0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

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Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Copper (Cu)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.011	.011	.011
20 mls 0.5 mg/l Cu and 30 mls Sample	.025	.025	.025
20 mls 1.0 mg/l Cu and 30 mls Sample	.040	.040	.040
20 mls 2.0 mg/l Cu and 30 mls Sample	.069	.069	.069

X - Intercept = .370

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.37 mg/l		-		0.37 mg/l Cu

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Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Nickel (Ni)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.019	.020	.020
20 mls 0.5 mg/l Ni and 30 mls Sample	.030	.029	.030
20 mls 1.0 mg/l Ni and 30 mls Sample	.040	.040	.039
20 mls 2.0 mg/l Ni and 30 mls Sample	.057	.057	.055

X - Intercept = 0.95

Sample Concentration	x	Dilution Factor	=	Actual Concentration
0.95 mg/l		-		0.95 mg/l Ni

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Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Zinc (Zn)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.280	.279	.280
20 mls 0.5 mg/l Zn and 30 mls Sample	.335	.334	.333
20 mls 1.0 mg/l Zn and 30 mls Sample	.387	.388	.386
20 mls 2.0 mg/l Zn and 30 mls Sample	.483	.480	.483

X - Intercept = 2.65

Sample Concentration	x	Dilution Factor	=	Actual Concentration
2.65 mg/l		-		2.65 mg/l Zn

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E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Chromium, Total (Cr)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cr and 30 mls Sample	.010	.010	.011
20 mls 1.0 mg/l Cr and 30 mls Sample	.019	.019	.019
20 mls 2.0 mg/l Cr and 30 mls Sample	.037	.037	.036

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		$\leq$ 0.05 mg/l Cr

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

William J. Guerrera
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dlw

Atomic Absorption Analysis — Stanley Tools - Fowlerville

E.P. Toxicity Extraction — E.P.A. I.D. #MID099124299

Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Lead (Pb)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Pb and 30 mls Sample	.006	.005	.007
20 mls 1.0 mg/l Pb and 30 mls Sample	.013	.013	.012
20 mls 2.0 mg/l Pb and 30 mls Sample	.025	.026	.026

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.05 mg/l Pb

N.D. - Not detected, sample concentration was found to be less than the detection limit given.

William J. Guerrera
Stanley Laboratory

dlw

Atomic Absorption Analysis

Stanley Tools - Fowlerville

E.P. Toxicity Extraction

E.P.A. I.D. #MID099124299

Sample M

Acid digested and analyzed by the Method of Standard Additions performed in triplicate.

Dilution Factor None

Element Analyzed Cadmium (Cd)

Standard Additions	Absorbance		
20 mls Blank and 30 mls Sample	.000	.000	.000
20 mls 0.5 mg/l Cd and 30 mls Sample	.041	.041	.042
20 mls 1.0 mg/l Cd and 30 mls Sample	.081	.082	.082
20 mls 2.0 mg/l Cd and 30 mls Sample	.156	.156	.156

X - Intercept = .000

Sample Concentration	x	Dilution Factor	=	Actual Concentration
N.D. mg/l		-		<0.02 mg/l Cd

N.D. - Not detected, sample concentration was found to be lower than the detection limit given.

William J. Guerrera
Stanley Laboratory

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STANLEY

THE STANLEY WORKS

Since 1843

NEW BRITAIN, CONNECTICUT 06050

(203) 225-5111

November 23, 1983

Mr. William D. Ruckelshaus,
Administrator
U.S. Environmental Protection Agency
Washington, D. C. 20460

RE: Stanley Tools - Fowlerville
EPA ID #MID099124299

Dear Mr. Ruckelshaus:

The following petition for the delisting of electroplating wastewater treatment sludge, EPA Hazardous Waste Code Number F006, is being submitted to you by The Stanley Works Corporate Laboratory. The Stanley Works is the owner of the Stanley Tools facility located in Fowlerville, Michigan and herein identified as Stanley Tools-Fowlerville.

This is the second and final part of the petition. This part contains the cyanide analyses, and the determination of the oil and grease content of the sludge. Together both parts fulfill the requirements pursuant to Title 40 CFR Part 260.22.

Samples were taken of the underflow from the clarifier as it is being discharged to the surface impoundments for settling. As discussed with Mr. Myles Morse on August 31, 1983, these samples would be representative of our sludge generation in a worst case condition, since the sludge would not be allowed to further settle and age in the surface impoundments.

The samples collected on November 8, 9, 14 and 16 , 1983 did not exhibit any significant levels of sulfide and no interference from sulfide was noted during the cyanide analyses. We can now conclude that the sulfide interference present in the samples taken from the surface impoundments on March 17, 1983 is the result of natural bacteriological attack of organic matter in the surface impoundments.

Mr. William D. Ruckelshaus
Washington, D.C.

RE: Stanley Tools - Fowlerville
EPA ID #MID099124299

The Part II delisting petition certification will be signed by a Corporate Vice President. I gratefully request that any inquiries regarding this petition be referred to me.

Sincerely,

THE STANLEY WORKS

William J. Guerrera

William J. Guerrera
Environmental Chemist
Stanley Laboratory
1309 Corbin Avenue
New Britain, CT 06053
(203) 225-5111 - Ext.5211

jzz

EPA ID #MID099124299

The following information listed below has been addressed in Part I of the petition submitted earlier. Part II of the petition will fulfill the requirements pusuant to Title 40 CFR Part 260.22:

Petitioner

Statement of Interest and Need

Proposed Action

Location of the Generating Facility

Description of Manufacturing Processes, Raw Materials Used and Assessment of Operations

General Description of Wastewater Treatment Operations

The Estimated Sludge Generation

Discussion of Factors Delineated in Criteria for Listing Hazardous Waste

1. Name and Address of the Laboratory performing the testing.

The Stanley Works
Corporate Laboratory
1309 Corbin Avenue
New Britain, CT 06053

2. Name of persons sampling and testing the waste.

a) Sampling - Reza Rejaei, Stanley Tools, Fowlerville

The underflow from the clarifier was sampled every half hour during the time period when treated cyanide wastewater was being pumped to the clarifier from the cyanide treatment tanks. The samples were collected and composited in a plastic bucket and a one gallon sample of the composite was sent to the Corporate Laboratory arriving the day after it was collected for analysis.

b) Testing - William J. Guerrera, The Stanley Works Laboratory

Mr. Guerrera performed the deionized water extractions and the oil and grease determinations on the samples. The deionized water extractions were started on the same day that the samples arrived at the Laboratory. The procedure used was identical to the procedure outlined in the E.P. Toxicity Extraction Procedure with the exception that no acid was added to the sample and the total volume of deionized water used was equivalent to twenty (20) times the weight of the sludge sample charged to the extractor. The determination of the oil and grease content of the sludge was also performed on the same day that the samples arrived at the Laboratory utilizing a Gravimetric, Separatory Funnel Freon Extraction.

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Testing - Philip L. Talarico, The Stanley Works Laboratory

The wet chemical analyses were performed by Mr. Talarico. Total Cyanide, Amenable Cyanide and Leachable Cyanide were analyzed by the acid distillation method. Total and Amenable Cyanide determinations were performed on the same day that the samples arrived at the Laboratory. The Leachable Cyanide determinations were performed at the end of the twenty-four (24) hour extraction.

3. Sampling and Testing Data:

a) Sampling was performed on the following dates:

H -11/8/83,	11 AM- 3 PM	G -11/14/83,	8 AM-12 PM
K -11/9/83,	10 AM- 2 PM	L -11/16/83,	1 PM- 5 PM

b) Total, Amenable and Leachable Cyanide analyses were performed on the following dates:

11/9/83	11/15/83	11/18/83
11/10/83	11/16/83	
11/11/83	11/17/83	

c) Oil and grease determinations were made on the following dates:

11/9/83	11/15/83
11/10/83	11/17/83

EPA ID #MID099124299

4. Sampling Methodology:

As discussed in 2A Sampling, the underflow from the clarifier was sampled each half hour during the time period when treated cyanide wastewater was being pumped to the clarifier for pH adjustment and further precipitation of metals. The sampling was accomplished by opening the blowdown valve and collecting a sample from the underflow. Each sample collected during the discharge cycle was placed in a covered plastic bucket. At the end of the cycle, the samples in the bucket were mixed well and a one (1) gallon composite sample was poured off. The sample was delivered using an overnight delivery service and arrived at the Laboratory for analysis on the following day.

The flow from the rinse waters following process operations that contain cyanide are fairly steady. The cyanide bearing rinse waters are pumped to the cyanide retention tanks for treatment. These tanks, in which treatment is performed, also act as an equalization basin for the cyanide bearing discharges. At the present time, there are three (3) cyanide retention tanks, each tank holds approximately 32,000 gallons. When production is at its peak, approximately 80,000 gallons of cyanide wastewater is generated per week. The cyanide wastewater is pumped to an empty retention tank until the level reaches the full capacity marking. At that point, the cyanide wastewater is directed to another empty retention tank and treatment is started on the full tank. After the completion of the treatment cycle, the treated wastewater is slowly pumped to the clarifier. Approximately one-half the volume of the retention tank is bled into the clarifier over a 4 hour period. The treated wastewater that remains in the retention tank is then slowly bled into the clarifier on the following day. The procedure is then repeated on another retention tank that has reached full capacity.

Based upon the above described operation, the monitoring and sampling of the underflow from the clarifier during the time period when the treated wastewater is being bled into the clarifier would constitute a representative sampling of the cyanide discharges from the clarifier.

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5. Sample Handling & Testing Methodology:

The samples were kept in sealed Nalgene bottles at all times. At the time of testing, each sample was well mixed with a paddle mixer, and a portion of the sample slurry was drawn off using Tygon tubing and a vacuum line. For the Cyanide analyses, the slurry was collected in pre-weighed 500 ml Nalgene bottles which were covered to prevent evaporation losses. A minimum of 100 grams of slurry was initially taken for each of the cyanide analyses.

The slurry samples were subjected to a Deionized Water E.P. Toxicity Extraction Procedure to determine the amount of leachable cyanide present. This procedure is similar to the E.P. Toxicity Extraction Procedure outlined in, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 1310. The exception being that no acid is added to the sample, and twenty (20) times the sample weight of deionized water is added to the extractor at the start of the extraction. A Millipore Hazardous Waste Filtration Unit using a pre-weighed 142 mm, 0.45 micron filter pad and nitrogen as the pressurizing gas was incorporated to achieve the solid-liquid separation. The liquid portion of the samples was collected in glass 500 ml Erlenmyer flasks and were stoppered immediately after the liquid flow ceased and the pressurizing nitrogen gas evolved from the filter unit. Liquid fractions from the initial separation were preserved with sodium hydroxide to a pH of greater than 11.0, and were stored at $4^{o}C$ for future usage. The remaining solid portion was evaluated for particle size. The solid sample along with the filter pad and the support screen were placed in a covered Petri dish and the solids were immediately weighed to the nearest 0.1 mg. After weighing, the solid samples were introduced into a suitable extractor along with twenty (20) times their weight of deionized water. The agitation was started and the initial pH of the solution was measured. The agitation was continued for a 24-hour period. At the end of the 24-hour period, the pH was measured and the agitation was stopped. The extracted solution was then introduced into the Hazardous Waste Filtration Unit and the solid and liquid portions were separated using a 142 mm, 0.45 micron filter pad and nitrogen gas for pressurization. The resultant filtrate was collected in a 1000 ml glass Erlenmyer flask and combined with the initial filtrate obtained from the initial solid-liquid separation. The combined solution was then analyzed for cyanide content in accordance with the procedures outlined in the, "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. EPA Publication #SW-846, Second Edition, July 1982, Method 9019.

Samples of the slurry were also collected and analyzed for both total and amenable cyanide in accordance with the test method referenced above.

Samples were also collected and evaluated for oil and grease content in accordance with the procedures outlined in the, "Methods for Chemical Analyses of Water and Waste", U.S. EPA Publication #EPA 600/4-79-020, March 1979, Method 413.1, STORET No. 00556. This method incorporates the use of Freon 113 as the extraction solvent in a separatory funnel extraction. The amount of Freon extractable matter is determined gravimetrically.

Approximately 1 liter from each of the well mixed slurry samples was drawn off for testing. The sample was placed in a beaker and the pH of the slurry was adjusted to pH 2.0 with hydrochloric acid. The pH adjusted sample was then transferred to a 2000 ml separatory funnel. The beaker was then thoroughly rinsed out with 30 mls of Freon 113, then the washings were transferred to the separatory funnel. The sample was extracted by shaking vigorously for 2 minutes. Then the layers were allowed to separate. While the layers were settling, a clean 250 ml boiling flask was weighed up. The settled solvent layer was then passed through a funnel with a solvent moistened Whatman #40 filter paper and collected in the tared 250 ml flask. The aqueous slurry sample in the separatory funnel was extracted twice more with additional portions of fresh solvent. All the Freon 113 extracts were collected in the same boiling flask. The tip of the separatory funnel, the filter paper, and then the funnel, were rinsed with 20 mls more of fresh solvent, the washings were collected in the boiling flask. The flask was gently heated in a water bath at 50^{o}C until all the solvent was evaporated off. The flask was then quickly removed from the water bath and the outside of the flask was wiped to remove any moisture or fingerprints remaining on the flask. The flask was cooled in a desiccator for 1/2 hour and then reweighed. A blank sample utilizing the same volume of Freon 113 as required for the sample extraction was also tested in this manner. The amount of Freon 113 extractable matter was then calculated from the weights obtained and initial volume of slurry sample used.

6. Testing Results:

The results of cyanide analyses and the oil and grease determinations have been tabulated on the pages following. The cyanide and the oil and grease determination have both been reported in mg/l. Blank and standard reference samples were analyzed in both the cyanide analyses and the oil and grease determinations. The reagents used to prepare the reference standards were all of reagent grade purity. The cyanide was analyzed titrimetrically while the oil and grease determinations were made gravimetrically.

EPA ID #MID099124299

7. Names and Model Numbers of the Instruments Used:

a) Mettler H31 Electronic Balance with Sensitivity to 0.1 mg.

b) Orion Model 501 Digital pH Meter.

c) Millipore Hazardous Waste Filtration Unit Catalog #YT30142HW.

d) Millipore 0.45 Micron Membrane Filters, 142 mm Diameter, Catalog #HAWP14250.

e) SGA Scientific, Cyanide Distillation Apparatus, Referenced in ASTM Test Method D2036, Catalog #JD-1360.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and, that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

THE STANLEY WORKS

Richard H. Ayers
Group Vice President

jzz

EPA I.D.# MID099124299

The analytical data presented on the following pages has been developed by The Stanley Works Corporate Laboratory. Included in the data is a summary sheet of all the analyses performed on the samples and individual data sheets detailing both sample and standard values obtained for Total Cyanide, Leachable Cyanide, and Cyanide Amenable to Chlorination. The results of the Freon Extractable Oil and Grease determinations are also included in the data.

Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample 1.00 mg/l Cyanide Standard

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 500 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.67 = A

Blank Titration mls $AgNO_3$ Used - 0.17 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.67 - 0.17}{500} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 1.00 mg/l CN

Percent Recovery - 100%

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample 273.0 mg/l Cyanide Standard

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 25 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 6.83 = A

Blank Titration mls $AgNO_3$ Used - 0.17 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{6.83 - 0.17}{25} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 266.4 mg/l CN

Percent Recovery - 97.6%

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample G

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.26 = A

Blank Titration mls $AgNO_3$ Used - 0.10 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{\text{A-B}}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.26 - 0.10}{100} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 1.60 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample H

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 1.27 = A

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{\text{A-B}}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{1.27 - 0.14}{100} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 11.3 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample K

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 1.69 = A

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{1.69 - 0.14}{100} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 15.5 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Total Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample L

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 200 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 1.85 = A

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{\text{A-B}}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{1.85 - 0.14}{200} \times 1000 \times \frac{250}{250}$$

Total Cyanide Concentration = 8.55 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Amenable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample G

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Chlorinated Sample Titration mls $AgNO_3$ Used - 0.26 = C

Blank Titration mls $AgNO_3$ Used - 0.10 = B

Calculations:

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{C-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{0.26 - 0.10}{100} \times 1000 \times \frac{250}{250}$$

Chlorinated Sample = 1.60 mg/l CN

Amenable Cyanide = Total Cyanide - Chlorinated Cyanide

0 mg/l 1.60 mg/l 1.60 mg/l

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Amenable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample H

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Chlorinated Sample Titration mls $AgNO_3$ Used - 0.82 = C

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{\text{C-B}}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{0.82 - 0.14}{100} \times 1000 \times \frac{250}{250}$$

Chlorinated Sample = 6.8 mg/l CN

Amenable Cyanide = Total Cyanide - Chlorinated Cyanide

4.5 mg/l 11.3 mg/l 6.8 mg/l

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Amenable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample K

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 100 mls

Distillate Sample Titrated 250 mls

Chlorinated Sample Titration mls $AgNO_3$ Used - 1.32 = C

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{C-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{1.32 - 0.14}{100} \times 1000 \times \frac{250}{250}$$

Chlorinated Sample = 11.8 mg/l CN

Amenable Cyanide = Total Cyanide = Chlorinated Cyanide

3.7 mg/l 15.5 mg/l 11.8 mg/l

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Amenable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample L

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 200 mls

Distillate Sample Titrated 250 mls

Chlorinated Sample Titration mls $AgNO_3$ Used - 0.50 = C

Blank Titration mls $AgNO_3$ Used - 0.14 = B

Calculations:

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{C-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide in Chlorinated Sample, mg/l} = \frac{0.50 - 0.14}{200} \times 1000 \times \frac{250}{250}$$

Chlorinated Sample = 1.80 mg/l CN

Amenable Cyanide = Total Cyanide - Chlorinated Cyanide

6.75 mg/l 8.55 mg/l 1.80 mg/l

William J. Guerrera
Stanley Laboratory

jzz

Cyanide Analysis
Leachable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample G

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 500 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.30 = A

Blank Titration mls $AgNO_3$ Used - 0.10 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.30 - 0.10}{500} \times 1000 \times \frac{250}{250}$$

Leachable Cyanide Concentration = 0.40 mg/l CN

William J. Guerrera
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Cyanide Analysis
Leachable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample H

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 500 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.27 = A

Blank Titration mls $AgNO_3$ Used - 0.17 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.27 - 0.17}{500} \times 1000 \times \frac{250}{250}$$

Leachable Cyanide Concentration = 0.20 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Leachable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample K

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 500 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.29 = A

Blank Titration mls $AgNO_3$ Used - 0.17 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.29 - 0.17}{500} \times 1000 \times \frac{250}{250}$$

Leachable Cyanide Concentration = 0.24 mg/l CN

William J. Guerrera
Stanley Laboratory

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Cyanide Analysis
Leachable Cyanide

Stanley Tools - Fowlerville
EPA I.D. #MID099124299

Sample L

Acid Distillation Utilizing a Titrimetric End-Point Determination.

Titrant: Silver Nitrate , ($AgNO_3$) 0.0192N, 1 ml = 1 mg Cyanide (CN)

Original Sample Size 473.5 mls

Distillate Sample Titrated 250 mls

Sample Titration mls $AgNO_3$ Used - 0.23 = A

Blank Titration mls $AgNO_3$ Used - 0.16 = B

Calculations:

$$\text{Cyanide Concentration, mg/l} = \frac{A-B}{\text{mls Original Sample}} \times 1000 \times \frac{250}{\text{mls Distillate Titrated}}$$

$$\text{Cyanide Concentration, mg/l} = \frac{0.23 - 0.16}{473.5} \times 1000 \times \frac{250}{250}$$

Leachable Cyanide Concentration = 0.15 mg/l CN

William J. Guerrera
Stanley Laboratory

jzz

Oil and Grease Analysis
Freon 113 Solvent Residue

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample - Freon 113 Extraction Solvent

Volume of Sample Extracted - 1000 mls

Weight of Flask & Residue - 110.0731 gm
Weight of Flask - 110.0730 gm
Weight of Residue - 0.0001 gm

Weight of Residue For Blank - 0.1 mg

William J. Guerrera
Stanley Laboratory

Oil and Grease Analysis
Freon 113 Extraction

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample 410.0 mg/l Freon Extractable Oil Standard

Volume of Sample Used	-	500	mls
Volume of Acid Added	-	1.5	mls
Total Volume Extracted	-	501.5	mls

Weight of Flask and Residue	-	113.1467	gm
Weight of Flask	-	112.9437	gm
Weight of Sample Residue	-	0.2030	gm

Calculations:

$$\text{Total Oil and Grease, mg/l} = \frac{\text{Weight of Sample Residue-Weight of Solvent Blank Residue*}}{\text{Total Volume Extracted}}$$

$$\text{Total Oil and Grease} = \frac{203.0 \text{ mg} - 0.1 \text{ mg}}{0.5015 \quad 1}$$

Total Oil and Grease - 404.6 mg/l

Percent Recovery - 98.7%

* A solvent blank was analyzed to determine the residue from an equivalent volume of extraction solvent. When one liter of triple distilled Freon 113 was extracted, the residue was found to be 0.1 mg.

William J. Guerrera
Stanley Laboratory

Oil and Grease Analysis
Freon 113 Extraction

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample G

Volume of Sample Used	-	1000	mls
Volume of Acid Added	-	100	mls
Total Volume Extracted	-	1100	mls
Weight of Flask and Residue	-	110.1248	gm
Weight of Flask	-	110.0680	gm
Weight of Sample Residue	-	0.0568	gm

Calculations:

$$\text{Total Oil and Grease, mg/l} = \frac{\text{Weight of Sample Residue} - \text{Weight of Solvent Blank Residue*}}{\text{Total Volume Extracted}}$$

$$\text{Total Oil and Grease} = \frac{56.8 \text{ mg} - 0.1 \text{ mg}}{\frac{1.100}{1}}$$

Total Oil and Grease - 51.6 mg/l

* A solvent blank was analyzed to determine the residue from an equivalent volume of extraction solvent. When one liter of triple distilled Freon 113 was extracted, the residue was found to be 0.1 mg.

William J. Guerrera
Stanley Laboratory

Oil and Grease Analysis
Freon 113 Extraction

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample H

Volume of Sample Used	-	990	mls
Volume of Acid Added	-	68	mls
Total Volume Extracted	-	1058	mls
Weight of Flask and Residue	-	110.1382	gm
Weight of Flask	-	110.0943	gm
Weight of Sample Residue	-	0.0439	gm

Calculations:

$$\text{Total Oil and Grease, mg/l} = \frac{\text{Weight of Sample Residue-Weight of Solvent Blank Residue*}}{\text{Total Volume Extracted}}$$

$$\text{Total Oil and Grease} = \frac{43.9 \text{ mg} - 0.1 \text{ mg}}{1.058 \quad 1}$$

Total Oil and Grease - 41.4 mg/l

* A solvent blank was analyzed to determine the residue from an equivalent volume of extraction solvent. When one liter of triple distilled Freon 113 was extracted, the residue was found to be 0.1 mg.

William J. Guerrera
Stanley Laboratory

Oil and Grease Analysis
Freon 113 Extraction

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample K

Volume of Sample Used	-	1010	mls
Volume of Acid Added	-	95	mls
Total Volume Extracted	-	1105	mls

Weight of Flask and Residue	-	110.4540	gm
Weight of Flask	-	110.3946	gm
Weight of Sample Residue	-	0.0594	gm

Calculations:

$$\text{Total Oil and Grease, mg/l} = \frac{\text{Weight of Sample Residue} - \text{Weight of Solvent Blank Residue*}}{\text{Total Volume Extracted}}$$

$$\text{Total Oil and Grease} = \frac{59.4 \text{ mg} - 0.1 \text{ mg}}{1.105 \quad 1}$$

Total Oil and Grease - 53.7 mg/l

* A solvent blank was analyzed to determine the residue from an equivalent volume of extraction solvent. When one liter of triple distilled Freon 113 was extracted, the residue was found to be 0.1 mg.

William J. Guerrera
Stanley Laboratory

Oil and Grease Analysis
Freon 113 Extraction

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

Gravimetric, Separatory Funnel Freon 113 Extraction

Sample L

Volume of Sample Used	-	1000	mls
Volume of Acid Added	-	100	mls
Total Volume Extracted	-	1100	mls

Weight of Flask and Residue	-	110.1260	gm
Weight of Flask	-	110.0720	gm
Weight of Sample Residue	-	0.0540	gm

Calculations:

$$\text{Total Oil and Grease, mg/l} = \frac{\text{Weight of Sample Residue-Weight of Solvent Blank Residue*}}{\text{Total Volume Extracted}}$$

$$\text{Total Oil and Grease} = \frac{54.0 \text{ mg} - 0.1 \text{ mg}}{1.100 \quad 1}$$

Total Oil and Grease - 49.0 mg/l

* A solvent blank was analyzed to determine the residue from an equivalent volume of extraction solvent. When one liter of triple distilled Freon 113 was extracted, the residue was found to be 0.1 mg.

William J. Guerrera
Stanley Laboratory

Analysis Data

Stanley Tools - Fowlerville
EPA I.D.# MID099124299

	CYANIDE ANALYSES, mg/l			OIL AND GREASE, mg/l
SAMPLE	TOTAL	AMENABLE*	LEACHABLE	FREON 113 EXTRACTABLE
G	1.60	0.00	0.40	51.6
H	11.3	4.50	0.20	41.4
K	15.5	3.70	0.24	53.7
L	8.55	6.75	0.15	49.0

* AMENABLE TO CHLORINATION

Sample H, 11/8/83, 11 a.m. - 3 p.m.
Sample K, 11/9/83, 10 a.m. - 2 p.m.
Sample G, 11/14/83, 8 a.m. - 12 p.m.
Sample L, 11/16/83, 1 p.m. - 5 p.m.

William J. Guerrera
Stanley Laboratory

STANLEY

THE STANLEY WORKS

Since 1843

NEW BRITAIN, CONNECTICUT 06050

(203) 225-5111

February 29, 1984

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

Dear Ms. Bush:

Enclosed please find the additional information you have requested to complete the review of the Delisting Petition (#0533) submitted by The Stanley Works Corporate Laboratory for the Stanley Tools - Fowlerville facility. I have attached the Material Safety Data Sheets for the chemical compounds used in our finishing process that may enter the waste stream. You will note that I have not included the data sheets on the basic raw materials that make up the primary plating process solutions such as, sodium cyanide, caustic soda, copper metal anodes, nickel sulfate hexahydrate, nickel chloride hexahydrate, boric acid, nickel metal anodes, chromic acid, sulfuric acid, and insoluble lead metal anodes. Much information on the safety and toxicity of these materials can be readily obtained from a variety of reference materials.

The additional information you have asked for, will be answered in Paragraph form.

1. Past Disposal Practices:

The Stanley Works acquired the Stanley Tools - Fowlerville facility in January of 1980. The metal hydroxide sludge was accumulated in the surface impoundments until October 1980, when approximately 97,000 gallons of metal hydroxide sludge was pumped out of the surface impoundments by Chem-Met Services of Wyandotte, Michigan and transported to their facility for disposal. The remaining sludge was left to accumulate in the surface impoundments and became regulated as hazardous waste Code #F006 under RCRA on November 19, 1980.

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

2. Current Disposal Practices:

Chem-Met Services, EPA ID# MID096963194, is still being contracted as the disposal firm for the F006 waste stored in the surface impoundments. Once yearly, the surface impoundments are pumped out. The F006 sludge is transported to Chem-Met's facility where the sludge slurry is dewatered and the resultant solid sludge is combined with other solid metal hydroxide sludge of the same hazardous waste code classification. The solid material is then transported to Wayne County #2 Landfill for disposal.

3. Proposed Disposal Practice:

In the event that the F006 waste is delisted, the sludge would be handled as a solid waste and would be sent to Chem-Met Services for dewatering. The solid sludge that remains after dewatering would be sent to an engineered landfill for proper disposal.

4. Tests for Characteristic Hazardous Waste:

Ignitability Characteristic; The F006 sludge would not exhibit the characteristic of ignitability because the material is an aqueous slurry with approximately 97% water and 3% solid metal hydroxide sludge which does not readily ignite nor support combustion. This material does not exhibit a Flash Point less than 140^{o}F.

Corrosivity Characteristic; The F006 sludge does not exhibit the characteristic of corrosivity. When the pH of the sludge was measured, it was found to fall within the 9.03 to the 10.50 pH range which is within the non-corrosive pH range.

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

Reactivity Characteristic; The F006 sludge does not exhibit the characteristic of reactivity. The sludge does not react violently with water and when exposed to mild acids or alkalies does not generate toxic gases or vapors. Analysis of the sludge indicates that the free cyanide level in the sludge is well below 10 mg/l limit.

5. Total Metal Analysis, Arsenic, Mercury & Selenium:

The total metals analysis for arsenic, mercury, and selenium has been provided in Part I of the Delisting Petition. This information is available on Pages 7 and 55 of Part I of the Petition.

6. Total Organic Carbon Analysis:

Attached, with this letter, are the results of the Total Organic Carbon analysis (TOC) performed upon sludge samples from both the clarifier blowdown and the surface impoundment system. As discussed with Mr. Morse in our phone conversation of January 27, 1984, five representative samples would have to be submitted for TOC analysis. One sample being a composite sample of the clarifier blowdown, and the remaining four being composite samples taken from each of the four surface impoundments. Due to extremely cold weather conditions, two of the surface impoundments have frozen over making composite sampling of those two surface impoundments virtually impossible. I advised Mr. Morse of this situation and he had suggested that we forego the composite sampling of those two impoundments and obtain grab samples from them.

Ms. Barbara L. Bush
Office of Solid Waste (WH-562)
U. S. Environmental Protection Agency
Washington, D. C. 20460

Re: Delisting Petition #0533

The sampling was performed on February 7, 1984. Composite samples were obtained from surface impoundments Numbers 3 and 4 and grab samples were taken from surface impoundments Numbers 1 and 2. A composite of the clarifier blowdown was obtained from grab samples taken during the blowdown periods.

You will also note that along with the TOC analysis, the samples were also tested to determine the presence of the metal Thallium. Though Thallium is not listed as an EP Toxic Metal, a review of the Material Safety Data Sheets has alerted us to the fact that one of the products in use, Isobrite 607 used in our cyanide copper plating solution as an additive, contains small amounts of Thallium Carbonate. Each sample was analyzed for Total Thallium based upon the dosage rate of Isobrite 607, (one-third gallon per day added to a 5000 gallon plating tank with a small dragout rate), we would estimate that the amount of Thallium that may enter the sludge would be extremely small.

I am also including a summary sheet with this letter, detailing the analyses performed and the results of those analyses.

I will once again remind both you and Mr. Morse that the Stanley Tools-Fowlerville facility has received a request from EPA Region V for the submission of their Part B Permit application. The submission date is targeted for July 15, 1984.

I hope this additional information will assist you in completing your review of the petition in a timely manner. Should any additional information regarding this petition be needed, please contact me as soon as possible.

Sincerely,

William J. Guerrera

William J. Guerrera
Environmental Chemist
Stanley Laboratory
1309 Corbin Avenue
New Britain, CT 06053
(203) 225-5111 - Ext.5211

jzz

Ms. Barbara Bush
RE: Delisting Petition #0533

Analysis Data:

Sample #	Type	TOC	mg/l	Thallium (Tl)
1000	Blowdown Composite	1,400		2.0*
1001	Lagoon #1, Grab	51		2.0*
1002	Lagoon #2, Grab	3,100		2.0*
1003	Lagoon #3, Composite	1,300		2.0*
1004	Lagoon #4, Composite	100		2.0*

* - Not detected, concentration found to be lower than the detection limit given.

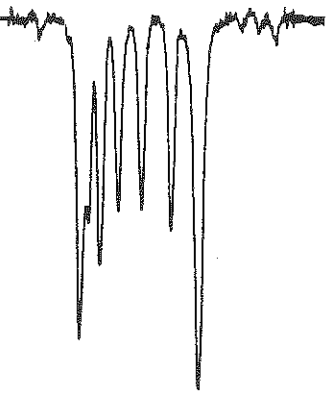
The analytical data presented on this page has been developed by Baron Consulting Company. The Thallium analysis was performed on a Perkin-Elmer 503 Atomic Absorption Spectrophotometer. The Thallium values were quantified by the method of standard additions. The TOC analysis was performed in accordance with Method 415.1 described in EPA-600/4-79-020 STORET No. 00680.

BARON CONSULTING CO.

HARRY AGAHIGIAN, Ph.D., DIRECTOR

analytical services

P.O. BOX 663, ORANGE CT. 06477



March 12, 1984

To: Mr. W.J. Guerrera
Stanley Works
P.O. Box 1308
New Britain, Conn. 06050

From: Robert O. Blake, Jr.

Re: Elemental Analysis P.O. # C29583
BC# 39387

Sample	TOC	Tl
1000	1,400	ND/2.0
1001	51	"
1002	3,100	"
1003	1,300	"
1004	100	"

These Samples were digested and run by Atomic Absorption using a Perkin-Elmer 503. The values for Tl were based on values obtained using the method of standard addition.

Sample homogeneity maybe a problem.

All values are expressed in mg/l.

Please review the data and contact us if you wish more information.

Robert O. Blake Jr.
Baron Consulting Co.

ROB/dc

LABORATORY LOCATED AT 273 BEDE'S FARM ROAD MILFORD CT. 06460 (203) 874-5670 874-5670 874-6930

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER	EMERGENCY TELEPHONE NO.
Isobrite 607	Day — (313) 437-8161
MANUFACTURER'S NAME	Nite — (313) 644-5626
ALLIED-KELITE Products, Division of the Richardson Co.	
ADDRESS (Number, Street, City, State and Zip Code)	
29111 Milford Rd., New Hudson, Michigan 48165	
CHEMICAL FAMILY	FORMULA
Copper Cyanide Additive	Proprietary

SECTION II — HAZARDOUS INGREDIENTS

		%	TLV (Units)
Thallium Compounds		0.32	
Water Base			
Poisonous by ingestion			

SECTION III — PHYSICAL DATA

BOILING POINT (°F) (°C)	> 212°	SPECIFIC GRAVITY (H_2O=1)	1.01		
VAPOR PRESSURE (mm Hg)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A		
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (=1)	N/A		
SOLUBILITY IN WATER		pH=			
Complete					
APPEARANCE AND ODOR					
Light yellow liquid - no odor					

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	LEL	UEL
Water solution - None			
EXTINGUISHING MEDIA			
Water or Foam			
SPECIAL FIRE FIGHTING PROCEDURES			
None			
UNUSUAL FIRE AND EXPLOSION HAZARDS			
None			

SECTION V – HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE	THRESHOLD LIMIT VALUE
Chronic toxicity - ingestion - weakness and pain in extremities - loss of hair.	

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush with water for 15 minutes – See a physician

Skin Contact: Thoroughly wash with soap and water

SECTION VI – REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Acids

HAZARDOUS DECOMPOSITION PRODUCTS:

Catastrophic fire may emit toxic fumes of Thallium

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water

WASTE DISPOSAL METHOD

When used in copper cyanide plating baths, #607 will be co-ppt. with conventional treatments. However, if desired #607 by itself can be ppt. by small amounts of Potassium Iodide.

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Dust Mask ____

VENTILATION			
	LOCAL EXHAUST (Specify Rate)	X	SPECIAL
	MECHANICAL (general) (Specify Rate)		OTHER

PROTECTIVE GLOVES		EYE PROTECTION	
	Rubber X		Goggles ____
	Plastic ____		Face Shield X

OTHER PROTECTIVE EQUIPMENT

Rubber Apron X Rubber Boots X

SECTION IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Protect from freezing ____ Isolate from reactive materials X Store away from direct heat X

Avoid skin or eye contact - wash thoroughly after handling.

OTHER PRECAUTIONS

SECTION X – TRANSPORTATION DATA

PROPER SHIPPING (Article) NAME	DOT CLASSIFICATION
Potassium Cyanide Solution	Poison

DOT LABEL	DOT MARKING	EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES
Poison	Poison	See Above

DOT PLACARD	PRECAUTIONS TO BE TAKEN IN TRANSPORTATION
Poison	See Above

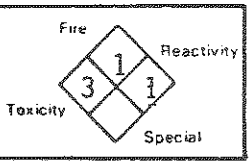
We believe the statements, technical information and recommendations contained herein are reliable, but are given without warranty or guarantee of any kind and we assume no responsibility for any loss, damage or expense, direct or consequential, arising out of their use.

ALLIED-KELITE PRODUCTS DIVISION

Witco MATERIAL SAFETY DATA SHEET

PRODUCT Isobrite 607

NFPA HAZARD RATING
4 – EXTREME
3 – HIGH
2 – MODERATE
1 – SLIGHT
0 – INSIGNIFICANT



SECTION I

1 WITCO MANUFACTURING DIVISION OR SUBSIDIARY

2 ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

EMERGENCY TELEPHONE
MANUFACTURER
( )
CHEM TREC 1-(800) 424-9300

3 CHEMICAL NAME OR FAMILY: Cyanide Copper Plating Solution Additive

4 FORMULA: Proprietary

SECTION II — CHEMICAL AND PHYSICAL PROPERTIES

CHEMICAL

5 HAZARDOUS DECOMPOSITION PRODUCTS: None

6 INCOMPATIBILITY (KEEP AWAY FROM): None

7 LIST ALL TOXIC AND HAZARDOUS INGREDIENTS: Thallium Carbonate - CAS 6533-73-9

PHYSICAL

8 FORM: Liquid

9 ODOR: None

10 APPEARANCE: Clear

11 COLOR: Light yellow

12 SPECIFIC GRAVITY (WATER = 1): 1.01

13 BOILING PT.: >100 °C / >212 °F

14 MELTING PT.: NA

15 SOLUBILITY IN WATER AT 20 °C: Complete

16 % VOLATILE (BY WT %): NA

17 EVAP. RATE (= 1): NA

18 VAPOR PRESSURE (mm Hg at 20 °C): NA

19 VAPOR DENSITY (AIR = 1): NA

20 pH AS IS: 8.0
pH ( ):

21
STRONG ACID ☐
STRONG BASE ☐
STABLE ☒
UNSTABLE ☐

22 VISCOSITY SUS AT 100 °F: NDA
<100 ☐
100 OR > ☐

23

SECTION III — FIRE AND EXPLOSION DATA

24 SPECIAL FIRE FIGHTING PROCEDURES: None

25 UNUSUAL FIRE AND EXPLOSION HAZARDS: None

26 FLASH POINT (METHOD USED): Water Solution °C °F

27 FLAMMABLE LIMITS %: None
LOWER ____ UPPER ____

EXTINGUISHING AGENTS
28
☐ DRYCHEMICAL ☒ CO_2
☒ WATERSPRAY ☒ FOAM
☐ WATERFOG ☐ SAND/EARTH
☐ OTHER ____

SECTION IV — HEALTH HAZARD DATA

29 PERMISSIBLE CONCENTRATIONS (AIR): OSHA STANDARD - air: TWA 0.1 mg/m^3 (as Thallium)

30 EFFECTS OF OVEREXPOSURE: Thallium Carbonate TXDS: oral-rat LDLO 23 mg/kg

31 TOXICOLOGICAL PROPERTIES
Acute - nausea, vomiting, diahhrea, weakness, coma, death.
Chronic - weakness and pain in extremities, loss of hair.

EMERGENCY FIRST AID PROCEDURES

32 EYES: Immediately flush with large amounts of water for 15 minutes. Call a physician.

33 SKIN CONTACT: Flush with large amounts of water for 15 minutes

34 INHALATION: Remove to fresh air.

35 IF SWALLOWED: Call a physician.

NA = NOT APPLICABLE NDA = NO DATA AVAILABLE < = LESS THAN > = MORE THAN

Witco MATERIAL SAFETY DATA SHEET

PRODUCT Isobrite 607

SECTION V — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Local to maintain below the OSHA standard for Thallium.

36

PROTECTIVE GLOVES

38 Rubber

EYE PROTECTION

39 Goggles, face shield

RESPIRATORY PROTECTION (SPECIFY TYPE)

None

37

OTHER PROTECTIVE EQUIPMENT

Rubber apron

40 Rubber gloves

SECTION VI — HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP

Wear protective clothing and equipment during clean-up. Absorb with an inert material such as sand, earth or vermiculite; sweep up and dispose of in accordance with federal, state and local regulations.

41

WASTE DISPOSAL

By methods consistent with federal, state, and local regulations.

42

SECTION VII — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Wear protective clothing and equipment while handling. Wash thoroughly after handling.

43

SECTION VIII — TRANSPORTATION DATA

44 UNREGULATED BY D.O.T. ☐

45 REGULATED BY D.O.T ☒

U.S. D.O.T. PROPER SHIPPING NAME

47 Poison Liquid NOS (Thallium Carbonate)

U.S. D.O.T. HAZARD CLASS

48 Poison B

I.D. NUMBER

49 UN-2810

TRANSPORTATION EMERGENCY INFORMATION

CHEM TREC

1-(800) 424-9300

46

RQ

50 NA

LABEL(S) REQUIRED

51 Poison

FREIGHT CLASSIFICATION

52 70

SPECIAL TRANSPORTATION NOTES

53 NA

SECTION IX — COMMENTS

Do not swallow. Avoid contact with clothing. Wash thoroughly after handling. Wash clothing before reuse. Keep from feed and food products. Keep out of reach of children. Keep container tightly closed when not in use.

54

SIGNATURE C.V. Wilkie C.V. Wilkie TITLE Sr. Dev. Chem.

REVISION DATE 11-29-83 SENT TO ATTN: DATE

SUPERSEDES

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER	EMERGENCY TELEPHONE NO.
Isobrite #622	Day – (313) 437-8161
MANUFACTURER'S NAME	Nite – (313) 644-5626
ALLIED-KELITE Products, Division of the Richardson Co.	
ADDRESS (Number, Street, City, State and Zip Code)	
29111 Milford Rd., New Hudson, Michigan 48165	
CHEMICAL FAMILY	FORMULA
Cyanide Copper Brightener	Proprietary

SECTION II – HAZARDOUS INGREDIENTS

		%	TLV (Units)
Selenium Compounds	<	0.1	
Cyanide Compounds	<	0.1	
Water Base			
Selenium and cyanide are both considered highly toxic.			

SECTION III – PHYSICAL DATA

BOILING POINT (X °F) (°C)	212°	SPECIFIC GRAVITY (H_2O=1)	1.001		
VAPOR PRESSURE (mm Hg)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A		
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (=1)	N/A		
SOLUBILITY IN WATER		pH=			
Complete					
APPEARANCE AND ODOR					
Clear white - no odor					

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	LEL	UEL
Water solution			
EXTINGUISHING MEDIA			
Water or Foam			
SPECIAL FIRE FIGHTING PROCEDURES			
None			
UNUSUAL FIRE AND EXPLOSION HAZARDS			
None			

SECTION V – HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE	THRESHOLD LIMIT VALUE
Swelling of feet, vomiting, nephritis and gastro-intestional disorders.	

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush with water for 15 minutes – See a physician

Skin Contact: Thoroughly wash with soap and water

SECTION VI – REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Strong acids or oxidants

HAZARDOUS DECOMPOSITION PRODUCTS:

Hydrogen Cyanide and Selenium in catastrophic fire.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wash and flush with large quantities of water.

WASTE DISPOSAL METHOD

As for sodium cyanide and selenium - if required.

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Dust Mask ____ None

VENTILATION			
	LOCAL EXHAUST (Specify Rate) X		SPECIAL
	MECHANICAL (general) (Specify Rate)		OTHER

PROTECTIVE GLOVES		EYE PROTECTION	
	Rubber X		Goggles ____
	Plastic ____		Face Shield X

OTHER PROTECTIVE EQUIPMENT

Rubber Apron X Rubber Boots ____ Periodic disposal of gloves if contaminated.

SECTION IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Protect from freezing ____ Isolate from reactive materials X Store away from direct heat X

None, except do not heat to evaporate.

OTHER PRECAUTIONS

SECTION X – TRANSPORTATION DATA

PROPER SHIPPING (Article) NAME	DOT CLASSIFICATION
Potassium Cyanide Solution	Poison

DOT LABEL	DOT MARKING	EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES
Poison	Poison	See Above

DOT PLACARD	PRECAUTIONS TO BE TAKEN IN TRANSPORTATION
Poison	See Above

ALLIED-KELITE PRODUCTS DIVISION

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER	EMERGENCY TELEPHONE NO.
Isobrite 630	Day – (313) 437-8161
MANUFACTURER'S NAME	Nite – (313) 644-5626
ALLIED-KELITE Products, Division of the Richardson Co.	
ADDRESS (Number, Street, City, State and Zip Code)	
29111 Milford Rd., New Hudson, Michigan 48165	
CHEMICAL FAMILY	FORMULA
Complexing Agents	Proprietary

SECTION II – HAZARDOUS INGREDIENTS

		%	TLV (Units)
Rochelle Salts and Similar Chelants	Approx.	60	
EDTA Tetrasodium Salt	Approx.	2	
Water		Bal.	

SECTION III – PHYSICAL DATA

BOILING POINT (X °F) (°C)	> 212°	SPECIFIC GRAVITY (H_2O=1)	1.28		
VAPOR PRESSURE (mm Hg)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A		
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (=1)	N/A		
SOLUBILITY IN WATER		pH=			
Complete			12		

APPEARANCE AND ODOR

Brown, dark colored solutions - slight ammonical odor

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	LEL	UEL
Non-flammable			

EXTINGUISHING MEDIA

Water or Foam

SPECIAL FIRE FIGHTING PROCEDURES

None

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

SECTION V – HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE	THRESHOLD LIMIT VALUE
Can be irritant to skin or eyes.	

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush with water for 15 minutes – See a physician

Skin Contact: Thoroughly wash with soap and water

SECTION VI – REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Strong oxidizing agents (i.e. chromic acid)

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water

WASTE DISPOSAL METHOD

No special problems

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Dust Mask ____ Non-volatile

VENTILATION		
	LOCAL EXHAUST (Specify Rate)	SPECIAL
	MECHANICAL (general) (Specify Rate)	OTHER

PROTECTIVE GLOVES		EYE PROTECTION	
	Rubber X		Goggles ____
	Plastic ____		Face Shield X

OTHER PROTECTIVE EQUIPMENT

Rubber Apron X Rubber Boots X

SECTION IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Protect from freezing ____ Isolate from reactive materials ____ Store away from direct heat X

Avoid skin or eye contact

OTHER PRECAUTIONS

SECTION X – TRANSPORTATION DATA

PROPER SHIPPING (Article) NAME	DOT CLASSIFICATION
Compound Cleaning Liquid	Non-Hazardous

DOT LABEL	DOT MARKING	EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES
N/R		

DOT PLACARD	PRECAUTIONS TO BE TAKEN IN TRANSPORTATION
N/R	

ALLIED-KELITE PRODUCTS DIVISION

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER	EMERGENCY TELEPHONE NO.
Isobrite 631	Day – (313) 437-8161
MANUFACTURER'S NAME	Nite – (313) 644-5626
ALLIED-KELITE Products, Division of the Richardson Co.	
ADDRESS (Number, Street, City, State and Zip Code)	
29111 Milford Rd., New Hudson, Michigan 48165	
CHEMICAL FAMILY	FORMULA
Complexing & mild reducing agents	Proprietary

SECTION II – HAZARDOUS INGREDIENTS

		%	TLV (Units)
Aldohexos	Approx.	60	
EDTA Tetrasodium Salt	Approx.	2	
Water		Bal.	

SECTION III – PHYSICAL DATA

BOILING POINT (X°F) (°C) >	212°	SPECIFIC GRAVITY (H_2O=1)	1.12		
VAPOR PRESSURE (mm Hg)	N/A	PERCENT VOLATILE BY VOLUME (%)	N/A		
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (=1)	N/A		
SOLUBILITY IN WATER Complete		pH=	11		

APPEARANCE AND ODOR
Clear Straw color - no odor

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	LEL	UEL
Water solution			

EXTINGUISHING MEDIA
Water or Foam

SPECIAL FIRE FIGHTING PROCEDURES
None

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

SECTION V – HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE	THRESHOLD LIMIT VALUE
Could be a skin and eye irritant.	Unknown

EMERGENCY AND FIRST AID PROCEDURES

Eye Contact: Immediately flush with water for 15 minutes – See a physician

Skin Contact: Thoroughly wash with soap and water

SECTION VI – REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATIBILITY (materials to avoid)

Strong oxidants

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water

WASTE DISPOSAL METHOD

Neutralize and dispose

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Dust Mask ____ None

VENTILATION			SPECIAL
	LOCAL EXHAUST (Specify Rate)	X	
	MECHANICAL (general) (Specify Rate)		OTHER

PROTECTIVE GLOVES		EYE PROTECTION	
	Rubber X		Goggles ____
	Plastic ____		Face Shield X

OTHER PROTECTIVE EQUIPMENT

Rubber Apron X Rubber Boots X

SECTION IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Protect from freezing ____ Isolate from reactive materials ____ Store away from direct heat X

Avoid skin and eye contact

OTHER PRECAUTIONS

SECTION X – TRANSPORTATION DATA

PROPER SHIPPING (Article) NAME	DOT CLASSIFICATION
Compound Cleaning Liquid	Non-Hazardous

DOT LABEL	DOT MARKING	EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES
N/R		

DOT PLACARD	PRECAUTIONS TO BE TAKEN IN TRANSPORTATION
N/R	

ALLIED-KELITE PRODUCTS DIVISION

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
OMI International Corporation - Udylite	(313) 497-9129

ADDRESS (Number, Street, City, State, and ZIP Code)
21441 Hoover Road, Warren, Michigan 48089

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Udylite Nickel Brightener 3J	Same

CHEMICAL FAMILY	FORMULA
See below	Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	No	No	BASE METAL	No	No
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
A dry mixture containing Boric Acid and an aromatic	-	NA
sulfo-oxygen compound	-	NA

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Unknown	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Slight		
APPEARANCE AND ODOR	White Powder		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	X	X	X

EXTINGUISHING MEDIA
No special requirements

SPECIAL FIRE FIGHTING PROCEDURES
None known

UNUSUAL FIRE AND EXPLOSION HAZARDS
None known

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None known or established

EFFECTS OF OVEREXPOSURE
Irritant to skin, eyes, and respiratory system

EMERGENCY AND FIRST AID PROCEDURES
Flush skin and eyes with clean, cool water

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
None known

HAZARDOUS DECOMPOSITION PRODUCTS
At extremely high temperatures oxides of sulfur and boron hydrides can form.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Work up-wind of spill. Sweep up and return to container for re-use or disposal. Flush residue away with water.

WASTE DISPOSAL METHOD
Use licensed waste disposal agent

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
For prolonged exposure, use mechanical dust respirator

VENTILATION				
	LOCAL EXHAUST	Yes	SPECIAL	No
	MECHANICAL *(General)*	No	OTHER	No

PROTECTIVE GLOVES	EYE PROTECTION
Rubber Gloves	Chemical safety goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Avoid skin and eye contact. Wash thoroughly after handling

OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
OMI International Corporation - Udylite	(313) 497-9129

ADDRESS (Number, Street, City, State, and ZIP Code)
21441 Hoover Road Warren, Michigan 48089

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Udylite Nickel Brightener 61 Adjustor	Same

CHEMICAL FAMILY	FORMULA
(See Below)	Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	No	No	BASE METAL	No	No
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
An aqueous solution of unsaturated sulfo-oxygen compounds, as	> 10	NA
with a pH range of 5 to 6		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	> 200°F	SPECIFIC GRAVITY (H_2O=1)	1.19
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	None
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Appreciable		NA
APPEARANCE AND ODOR	Light yellow liquid with an aromatic odor.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None	X	X

EXTINGUISHING MEDIA
None. Product does not burn.

SPECIAL FIRE FIGHTING PROCEDURES
None

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None known or established.

EFFECTS OF OVEREXPOSURE
May cause irritation.

EMERGENCY AND FIRST AID PROCEDURES
Flush skin and eyes with water. For eyes get medical attention.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Probable SO_2

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush with water.

WASTE DISPOSAL METHOD
Bury in impervious soil in accordance with local statutes.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None

VENTILATION		
	LOCAL EXHAUST: Yes	SPECIAL: No
	MECHANICAL *(General)*: No	OTHER: No

PROTECTIVE GLOVES	EYE PROTECTION
rubber gloves	chemical safety goggles

OTHER PROTECTIVE EQUIPMENT
None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Do not permit ambient temperature to exceed 110°F or fall below 32°F

OTHER PRECAUTIONS
Avoid excessive skin contact. Wash with soap and water after handling.

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
OMI International Corporation - Udylite	(313) 497-9129
ADDRESS (Number, Street, City, State, and ZIP Code) 21441 Hoover Road Warren, Michigan 48089	
CHEMICAL NAME AND SYNONYMS: Udylite Nickel Brightener 66 IT	TRADE NAME AND SYNONYMS: Same
CHEMICAL FAMILY: See Below	FORMULA: Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	No	No	BASE METAL	No	No
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Aqueous mixture of aliphatic alcohols	< 3	N.A.
aliphatic sulfonates	< 20	X
salt of a polyhydroxy acid	< 5	N.A.
and other organic additives		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	> 212 F	SPECIFIC GRAVITY (H_2O=1)	1.15
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Appreciable		X
APPEARANCE AND ODOR	Amber Liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	X	X	X

EXTINGUISHING MEDIA: N.A.

SPECIAL FIRE FIGHTING PROCEDURES: None Known

UNUSUAL FIRE AND EXPLOSION HAZARDS: Prolong heating at extremely high temperatures could liberate toxic oxides of sulfur.

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None Known or Established

EFFECTS OF OVEREXPOSURE
Skin Irritation

EMERGENCY AND FIRST AID PROCEDURES
Flush skin and eyes with water. For eyes, get medical attention.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
None Known

HAZARDOUS DECOMPOSITION PRODUCTS
None Known

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush area with water.

WASTE DISPOSAL METHOD
Refer to a licensed disposal agent.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None

VENTILATION	LOCAL EXHAUST: Yes	SPECIAL: No
	MECHANICAL *(General)*: No	OTHER: No

PROTECTIVE GLOVES: Rubber Gloves	EYE PROTECTION: Chemical Safety Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Avoid contact. Wash thoroughly after handling. Store upright at temperature between 32 F to 110 F.

OTHER PRECAUTIONS
For Industrial Use Only.

GPO 930-540
Form OSHA-20
Rev. May 72

STANLEY TOOL DIV.
FOWLERVILLE MI 48836

1-25-84

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MATERIAL SAFETY DATA SHEET

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SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Formax Mfg. Corp.	313-921-7030

ADDRESS (Number, Street, City, State, and ZIP Code)
3178 Bellevue Avenue, Detroit, MI 48207

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Animal Fatty Acid O/W Emulsion with Abrasives	Polishing Compound
CHEMICAL FAMILY: Organic	FORMULA: #1238a Liquid Compound

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

CONTAINS / NONE

CONTAINS / NONE

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212°F	SPECIFIC GRAVITY (H_2O=1)	1.2
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	0
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	H20
SOLUBILITY IN WATER	Emulsifies		
APPEARANCE AND ODOR	Beige to tan - bland odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
265°F COC			

EXTINGUISHING MEDIA: Water; dry chemical; CO_2; oil fire foams

SPECIAL FIRE FIGHTING PROCEDURES: Does not constitute a fire or explosive hazard

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	UNKNOWN
EFFECTS OF OVEREXPOSURE	NONE
EMERGENCY AND FIRST AID PROCEDURES	NONE REQUIRED

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	NONE
INCOMPATABILITY *(Materials to avoid)*			NONE
HAZARDOUS DECOMPOSITION PRODUCTS			NONE
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	NONE

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wipe or scoop up. Dispose of as a solid waste or incinerate

WASTE DISPOSAL METHOD

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*	NONE			
VENTILATION	LOCAL EXHAUST	X	SPECIAL	NONE
	MECHANICAL *(General)*	X	OTHER	
PROTECTIVE GLOVES	Operator preference		EYE PROTECTION	Safety glasses - contains abrasive
OTHER PROTECTIVE EQUIPMENT	NONE REQUIRED			

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING No special precautions required - store in cool space - keep from freezing to prevent breaking emulsion

OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
DELROD SALES CORPORATION	616-327-6722
ADDRESS (Number, Street, City, State, and ZIP Code): 2485 Zylman Road, Kalamazoo, Michigan 49002	
CHEMICAL NAME AND SYNONYMS: na	TRADE NAME AND SYNONYMS: DSC #3368 Compound
CHEMICAL FAMILY: buffing compound	FORMULA: proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) approximately	220	SPECIFIC GRAVITY (H_2O=1)	1.02
VAPOR PRESSURE (mm Hg.) less than	15	PERCENT, VOLATILE BY VOLUME (%)	0
VAPOR DENSITY (AIR=1)	na	EVAPORATION RATE (ether =1) greater than	1
SOLUBILITY IN WATER	complete	pH	9.5
APPEARANCE AND ODOR: clear solution, mild pleasant odor.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
na		unknown	unknown

EXTINGUISHING MEDIA: na

SPECIAL FIRE FIGHTING PROCEDURES: should not burn in as it or use condition.

UNUSUAL FIRE AND EXPLOSION HAZARDS: none are known.

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
not determined

EFFECTS OF OVEREXPOSURE
may dry skin upon prolonged or repeated exposure, may irritate especially sensitive skin.

EMERGENCY AND FIRST AID PROCEDURES
flush with water, at least 15 minutes if in eyes, consult physician if swelling, blushing or irritation persists after contact.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	xxxx	

INCOMPATABILITY *(Materials to avoid)*
strong oxidants

HAZARDOUS DECOMPOSITION PRODUCTS
none are known

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	xxxx	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
flush into chemical sewer or absorb onto solid absorbents.

WASTE DISPOSAL METHOD
landfill or incinerate as permitted by local, state and federal statutes.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
none under normal use conditions

VENTILATION	LOCAL EXHAUST: normally adequate	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES: rubber or poly	EYE PROTECTION: standard plant type

OTHER PROTECTIVE EQUIPMENT
none under normal use conditions.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
product will freeze at about +20°F. If frozen, thaw slowly and stir before using.

OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
DELROD SALES CORPORATION	616-327-6722
ADDRESS (Number, Street, City, State, and ZIP Code) 2485 Zylman Road, Kalamazoo, Michigan 49002	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS DSC #255
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____=1)	NA
SOLUBILITY IN WATER	MODERATE		
APPEARANCE AND ODOR	Cream colored powder, slight pine odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
NA	NA		

EXTINGUISHING MEDIA
NA

SPECIAL FIRE FIGHTING PROCEDURES
NA

UNUSUAL FIRE AND EXPLOSION HAZARDS
NA

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE
May cause eye or nasal irritation

EMERGENCY AND FIRST AID PROCEDURES
Flush eyes or skin with plenty of water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
NONE

HAZARDOUS DECOMPOSITION PRODUCTS
NONE

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Sweep up so as to minimum airborne dust.

WASTE DISPOSAL METHOD
Landfill or in accordance with local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* non-toxic particle mask

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)* forced draft ventilation	OTHER

PROTECTIVE GLOVES YES	EYE PROTECTION goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

U. S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

11686

SECTION I

MANUFACTURER'S NAME: MACDERMID, INC.	EMERGENCY TELEPHONE NO.: 203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code): 526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS: Metex S-486
CHEMICAL FAMILY: Soak Cleaner	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Light tan powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): None	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES: Mildly alkaline cleaner- Flush with plenty of water.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Flush with water.

WASTE DISPOSAL METHOD: Neutralize with dilute acid

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION	LOCAL EXHAUST: Dust mask	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES: Rubber

EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

U. S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

12277

SECTION I

MANUFACTURER'S NAME: MACDERMID, INC.	EMERGENCY TELEPHONE NO.: 203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code): 526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS: Metex P - 1777
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Carbonates	75	
Silicates	15	

SECTION III PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	White powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N.A.	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES N.A.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Carbon Dioxide can be emitted if heated to extreme temperature.			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Not Known.

EFFECTS OF OVEREXPOSURE: Cancuase slight skin irritation.

EMERGENCY AND FIRST AID PROCEDURES: Eyes - Flush with water for 15 minutes. Contact doctor.

Skin - Flush with water. wash with vinegar.

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY (Materials to avoid): Acids

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Flush with water to drain.

WASTE DISPOSAL METHOD: Neutralize to pH 7.0 and discard. Consult local regulations before discarding.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Dust mask

VENTILATION		
	LOCAL EXHAUST: X	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Rubber	Face shield

OTHER PROTECTIVE EQUIPMENT: Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in dry area.

OTHER PRECAUTIONS

U. S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

10351

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
MACDERMID, INC.	203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code)	
526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	EN-1751
CHEMICAL FAMILY	FORMULA
Electrocleaner	

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Sodium Hydroxide	19	2mg/M^3

SECTION III PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Complete		

APPEARANCE AND ODOR — Off white granular mixture.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None			

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: As with sodium hydroxide

EFFECTS OF OVEREXPOSURE: As with sodium hydroxide

EMERGENCY AND FIRST AID PROCEDURES: Flush with plenty of water. Neutralize with vinegar in case of skin contact a physician in case of injury.

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	Additions of cleaner should be made slowly and preferably in cold water. The reaction liberates heat.

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR	-	
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: As with sodium hydroxide.

WASTE DISPOSAL METHOD: Neutralize to pH between 6.0 to 8.0 with dilute acid prior to discharging to sewer.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION		
	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES: Rubber

EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: As with sodium hydroxide

OTHER PRECAUTIONS

U.S. Department of Labor
Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
BENCHMARK, INC.	313-285-0900/313-644-5626
ADDRESS (Number, Street, City, State, and ZIP Code) 4060 - 13th Street, Wyandotte, Michigan 48192	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS B-920
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Caustic Soda		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Approx. 150 g/l		
APPEARANCE AND ODOR	White powder - alkali odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
N/A			

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

None known

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

As caustic soda

EMERGENCY AND FIRST AID PROCEDURES

Treat as caustic soda

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	x	

INCOMPATIBILITY (Materials to avoid)

Acids

HAZARDOUS DECOMPOSITION PRODUCTS

None known

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	x	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep up - flush small amounts with water.

WASTE DISPOSAL METHOD

Neutralize - separate solids.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES Rubber	EYE PROTECTION Safety Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep dry.

OTHER PRECAUTIONS

GPO 934-110

MATERIAL SAFETY DATA SHEET
CLEPO 569-N

AUGUST 1983

********** SECTION 01 IDENTIFICATION **********

INFO FURNISHED BY.....	FREDERICK GUMM CHEM CO. INC.
ADDRESS.....	538 FOREST ST KEARNY NJ 07032
CHEMICAL NAME/SYNONYMS...	CLEPO 569-N
HAZARD CLASS.....	CHEMICAL N.O.S
CHEMICAL FAMILY.....	ADDITIVE FOR NITRIC ACID
EMERGENCY PHONE #.....	201-991-4174 OR 313-644-5626
FORMULA.....	PROPRIETARY

********** SECTION 02 PHYSICAL DATA **********

BOILING POINT(DEG F).....	>212 DEG F
VAPOR PRESSURE(mmHg).....	NA
VAPOR DENSITY(AIR=1).....	NA
SOLUBILITY IN WATER.....	COMPLETE
SPECIFIC GRAVITY(H2O=1)..	APPROX. 1.32
% VOLATILE BY VOLUME.....	APPROX. 45%
EVAPORATION RATE(H2O=1)..	NA
APPEARANCE & ODOR.....	DARK BROWN LIQUID

********** SECTION 03 FIRE AND EXPLOSION DATA **********

FLASH POINT..... NONE
EXTINGUISHING MEDIA..... NA
SPECIAL FIRE FIGHTING PROCEDURES
NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS
NONE

NFPA HAZARD CLASSIFICATION.....	HEALTH HAZARD(BLUE)	1
	FLAMMABILITY(RED)	0
	REACTIVITY(YELLOW)	1

********** SECTION 04 REACTIVITY DATA **********

STABILITY..... STABLE
CONDITIONS TO AVOID... NA
INCOMPATIBILITY(MATERIALS TO AVOID)
STRONG ALKALI
HAZARDOUS DECOMPOSITION PRODUCTS
NONE EXPECTED
HAZARDOUS POLYMERIZATION. WILL NOT OCCUR
CONDITIONS TO AVOID... NA

********** SECTION 05 HAZARDOUS COMPONENTS **********

PAINTS, PRESERVATIVES, & SOLVENTS .... NOT APPLICABLE
ALLOYS AND METALLIC COATINGS ..... NOT APPLICABLE

HAZARDOUS COMPONENT	% BY WEIGHT	TLV(Mg/M3)
IRON SALTS AS Fe	3.5	1

********** SECTION 06 SPILL LEAK AND DISPOSAL PROCEDURES **********

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
SWEEP UP AND/OR FLUSH TO WASTE DISPOSAL AREA. WATCH FOR SLIPPERY CONDITIONS

WASTE DISPOSAL METHOD
NEUTRALIZE TO LOCALLY ACCEPTABLE pH, DEPENDING ON USAGE AND LOCALITY, MAY ALSO REQUIRE PRECIPITATION OF HEAVY METALS. THEN DUMP TO DRAIN

********** SECTION 07 HEALTH HAZARD DATA **********

THRESHOLD LIMIT VALUE (CALCULATED) 28.57 (Mg/M3)

EFFECTS OF OVEREXPOSURE
CORROSIVE-WILL BURN SKIN AND EYES ... HARMFUL IF SWALLOWED

EMERGENCY AND FIRST AID PROCEDURES
REMOVE CONTAMINATED CLOTHING AND SHOES. FLUSH EFFECTED AREA WITH PLENTY OF WATER (FOR EYES, HOLD EYELIDS OPEN AND FLUSH WITH WATER FOR AT LEAST 15 MINUTES). IF SWALLOWED DO NOT INDUCE VOMITING GET MEDICAL ATTENTION

********** SECTION 08 SPECIAL HANDLING PROCEDURES **********

RESPIRATORY PROCTECTION(SPECIFY TYPE)
NOT GENERALLY REQUIRED

VENTILATION..... LOCAL EXHAUST SATISFACTORY

PROTECTIVE GLOVES..... RUBBER OR NEOPRENE

EYE PROTECTION..... CHEMICAL SAFETY GOGGLES AND/OR FACE SHIELD

OTHER PROTECTIVE EQUIPMENT
DEPENDING ON LOCAL CONDITIONS, RUBBER BOOTS AND APRON MAY BE NEEDED

********** SECTION 09 SPECIAL PRECAUTIONS **********

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
DO NOT STORE WITH STRONG ALKALIES. CONTAINER MUST NOT BE USED FOR ANY OTHER PURPOSE. KEEP TIGHTLY CLOSED

OTHER PRECAUTIONS
AVOID CONTACT WITH SKIN AND EYES